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19 SEPT. 1935
INSTITUTE

British Guiana.

ADMINISTRATION REPORT

OF THE

DIRECTOR OF AGRICULTURE

FOR THE YEAR

1934.

GEORGETOWN, DEMERARA:
PRINTERS TO THE GOVERNMENT OF BRITISH GUIANA.
"THE ARGOSY" COMPANY, LIMITED.
1935.

DEPARTMENT OF AGRICULTURE.

Director of Agriculture ... ...Prof. the Hon. J. Sydney Dash, B.S.A. (McGill).
Deputy Director ... ...F. Burnett, M.C., M.A. (Oxon).

DISTRICT STAFF.

Agricultural Superintendents ... E. M. Peterkin. / A. deK. Frampton, C.D.A. / H. Macluskie, U.D.A. (Aberdeen). / J. D. Gillespie, B.Sc., (Edin.). / H. D. Huggins, M.Sc. (Cornell), Dip. Agr.
Assistant Agricultural Superintendents A. A. Abraham. / E. G. A. Benson, B.Sc. (Lond.) Dip. Agr. (Wye), A.I.C.T.A.
Agricultural Instructors ... E. M. Morgan. / C. C. Dowding, F.L.S., F.R.H.S. / L. E. McKinnon. / A. W. Sears. / W. A. Bovell.
Agricultural Assistants ... J. Indrobeharry. / H. B. France.

RESEARCH—(LABORATORIES).

Entomologist (Seconded, Moth Borer Investigation)...L. D. Cleare, F.R.E.S., F.L.S.
Supernumerary Entomologist ... ...F. A. Squire, B.Sc. (S.A.), A.I.C.T.A., F.R.E.S.
Botanist and Mycologist ... ..E. B. Martyn, B.A. (Oxon et Cantab.), A.I.C.T.A.
Chemist-Ecologist ... ...R. R. Follett-Smith, B.Sc. (Lond.) A.R.C.S.
Assistant Chemist ... .C. L. C. Bourne.

RESEARCH—(FIELD EXPERIMENT STATIONS).

Livestock Farm, Georgetown—(Veterinary Surgeon)...T. Bone, O.B.E., M.R.C.V.S.
Experiment Station (Sugar), Sophia—(Agronomist)... ... ...C. H. B. Williams, M.A. (Harvard), A.I.C.T.A., Dip. Agr.
Experiment Station (Rice), Georgetown—(Plant Breeder) ... ...L. E. W. Codd, M.Sc. (S.A.), A.I.C.T.A.
Experiment Station Cecilia, E.C., Demerara ...E. M. Peterkin.
Experiment Station, Whim, Berbice ...H. Macluskie, U.D.A. (Aberdeen).
Experiment Station, Hosororo, N.W.D.
Experiment Station, Henrietta, Essequibo
Bush Lot Land Settlement Scheme... } A. deK. Frampton.
Demonstration and Queen-breeding Apiary, Botanic Gardens ... ...H. D. Huggins, M.Sc. (Cornell), Dip. Agr.

BOTANIC GARDENS.

Superintendent ... ...E. B. Martyn, B.A. (Oxon et Cantab.), A.I.C.T.A.
Horticultural Assistant ... ...H. A. Cole.
Clerical Assistant ... ...P. O. Jackson.

LABORATORY ASSISTANTS.

Meteorological Observer ... ...D. D. Blackman.
Entomological Assistant ... ...C. Williams.
Botanical and Mycological Assistant ...N. Persaud.

RICE GRADING.

Grading Inspector ... ...H. E. H. Gadd.
Senior Examiners (Georgetown and Springlands) ...G. L. Leitch, R. R. Ross.

CLERICAL STAFF, HEAD OFFICE.

Senior Clerk ... ...J. F. Irving, M.C.
Accountant (Acting) ... ...C. A. Lashley.
Accountant, Assistant .. ...E. H. Reis.
Class III. Clerks ... ...Miss N. Green, Miss D. M. Terrill.
Probationers ... ...Miss M. Cheong, Miss V. Chan Choong.

SUGAR EXPERIMENT STATIONS.

Agronomist ... ...C. H. B. Williams, M.A. (Harvard), A.I.C.T.A., Dip. Agr.
Field Manager ... ...C. Cameron.
Laboratory Assistants ... ...L. A. Robinson (seconded), H. B. Singh.
Field Assistants ... ...L. A. Forte, St. G. Cooper, Dip. Agr., B. A. McArthur.
Clerical Assistant ... ...J. B. Bourne.

(In collaboration with the officers of the Department of Agriculture).

CO-OPERATIVE CREDIT BANKS.

BOARD.

Director of Agriculture, Chairman, *ex-officio*.
Dr. the Hon. J. B. Singh ... } Members.
Hon. J. L. Wills ... ...
Rev. A. E. Dyett ... ...
Mr. C. Farnum ... ...

STAFF.

Registrar ... ...W. G. Delph,
Registrar, Assistant ... ...E. S. Douglas,

The District Agricultural Officers are Chairmen of the several banks.

C.S.O. No. 1113/35.

British Guiana.

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1935.

No. 16,409.

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REPORT OF THE DIRECTOR OF AGRICULTURE FOR THE YEAR 1934.

I have the honour to submit my report on the work of this Department for the year 1934. In accordance with the policy adopted in previous years, the reports of the Divisional Officers will be published separately.

STAFF.

Mr. J. D. Gillespie, B.Sc. (Edin.), Agricultural Superintendent, returned from six months' leave of absence on May 17, 1934.

Mr. A. A. Abraham, Assistant Agricultural Superintendent, resumed duty on March 15, 1934, after three months' leave of absence spent in the Colony.

Mr. W. G. Delph, Registrar and Auditor, Co-operative Credit Banks, was granted seven and a half months' leave of absence and left the Colony for Barbados on January 30. Mr. Delph was recalled before the expiration of his leave to act as Secretary, District Administration, *vice* Mr. E. S. Christiani on leave of absence as from August 8.

Consequent on the leave of absence of Mr. Delph, Mr. A. A. Thorne, Jnr., Accountant, was appointed to act as Registrar of Banks.

Mr. C. A. Lashley, was transferred from the Treasury as Mr. Thorne's *locum tenens.*

Professor the Hon. J. S. Dash, B.S.A. (McGill), Director of Agriculture, was granted three and a half months' leave of absence from the date of arrival in Canada. Professor Dash returned on September 19, 1934.

During his absence, Mr. F. Burnett, M.C., M.A. (Oxon), Deputy Director of Agriculture, acted as Director.

Mr. H. Macluskie, U.D.A. (Aberdeen), Agricultural Superintendent, was granted six months' leave of absence and left the Colony for the United Kingdom on May 31, and in addition one month's extension of leave on half salary as from December 14, 1934.

Mr. E. B. Martyn, B.A. (Oxon et Cantab), Botanist and Mycologist, was granted three months' and twenty four days leave of absence from date of arrival in England. He left the Colony on June 13, returning on November 13, 1934.

Mr. C. H. B. Williams, Cane Agronomist, who was granted study leave in 1933 to pursue a post-graduate course in Plant Breeding at Harvard University, returned to the Colony on June 26, 1934. Mr. Williams has fulfilled the requirments necessary for the Degree of M.A. of the University.

Mr. A. deK. Frampton, C.D.A., Agricultural Superintendent, has been promoted to the post of Agricultural Officer, Straits Settlement and Federated Malay States. This appointment takes effect as from 1935.

Mr. D. D. Haynes, Agricultural Instructor, was transferred to British Honduras and left the Colony on April, 7, 1934.

Capt. E. Beckett, F.L.S., F.E.S., Agricultural Superintendent, died on February 24, 1934, after a prolonged illness. Mr. Beckett had been associated with the Department for a number of years and his loss is greatly felt. An obituary notice

with fitting reference to Mr. Beckett's services appeared in the Agricultural Journal Vol. V. No. 1, while the Legislative Council voted his widow a gratuity of £400.

Mr. H. D. Huggins, M.Sc., Dip. Agr. (I.C.T.A.), Assistant Agricultural Superintendent, has been appointed Agricultural Superintendent, with effect as from February 24, 1934.

Mr. E. G. A. Benson, B.Sc., Dip. Agr., A.I.C.T.A., Rice Grading Inspector, has been appointed Assistant Agricultural Superintendent, *vice* Mr. Huggins, as from June 1, 1934.

Mr. H. E. H. Gadd, Secretary of the B.G. Rice Marketing Board has been tentatively appointed Rice Grading Inspector as well *vice* Mr. Benson ; this arrangement to be reviewed at the end of one year's trial.

Mr. L. E. McKinnon, Agricultural Foreman, has been appointed Agricultural Instructor *vice* Mr. Haynes with effect as from July 1, 1934.

Mr. W. A. Bovell, Rice Grading Examiner, has been appointed Agricultural Instructor with effect as from July 1, 1934.

Mr. G. L. Leitch, Clerk, Botanic Gardens, has been appointed Rice Grading Examiner, as from July 1, 1934.

Miss O. Bardon, Record Clerk, was transferred to the Colonial Secretary's Office, and Miss N. Green, Record Office, C.S.O., was appointed to the post as from March 1, 1934.

ADVISORY BOARD OF AGRICULTURE.

3. There was enacted on September 5, 1934, an Ordinance to provide for the establishment of an Advisory Board of Agriculture. The Board consists of the Director of Agriculture and the Deputy Director of Agriculture as Chairman and Vice-Chairman, *ex-officio*, respectively and the following seven appointed members ;— Hon. F. J. Seaford, Hon. R. E. Brassington, Hon. Peer Bacchus, Messrs. W. H. Richards, R. B. Hunter, J. F. Martins and S. Andries. Each member holds office for three years from the date of appointment but is eligible for re-appointment at the termination of the period of office.

EXPENDITURE.

4. The total vote assigned to the Department by the Legislature at its Session for the year was $115,492. The following expenditure was voted on Supplementary Estimates during the year 1934.

	Excesses to be met from savings on other sub-heads.
Fixed Establishment—	
Personal Emoluments ...	...$ 180 00
Unfixed Establishment—	
Personal Emoluments ...	... 90 32
Other Charges—	
Allowances for Upkeep of Bicycles	... 12 00
Travelling Expenses and Subsistence Allowances	... 1,400 00
Library and Publications ...	... 300 00
Furniture ...	... 25 00
Miscellaneous ...	... 85 00
Botanic Gardens, Maintenance of	... 100 00
	$ 2,192 32

Table 1.

ANNUAL ESTIMATES.

No. of Sub-vote.	Sub-vote.	Balance Unexpended.	Excess Expenditure.
1 (1-19)..	Personal Emoluments—Fixed	$ 1,014 18	
(20-33).	Do. —Unfixed	708 60	
2 ...	Allowance for upkeep of Bicycles	...	$ 18 00
3 ...	Travelling Expenses and Subsistence	...	1,749 58
4 ...	Library and Publications	...	297 73
5 ...	Furniture	...	20 29
6 ...	Freight	92 25	
7 ...	Uniform for Messengers	2 40	
8 ...	Uniform for Supernumerary Constables	2 03	
9 ...	Miscellaneous	...	115 72
10 ...	Provision and Maintenance of Scientific Apparatus and Equipment ...	43 05	
11 ...	Botanic Gardens, Maintenance of	..	91 18
12 ...	Upkeep of Government Gardens and Grounds	3 10	
13 ...	Purchase, Production and Distribution of Seeds and Plants	6 71	
14 ...	Experiment Stations—Demerara, Essequibo, Berbice, North West District ...	186 83	
15 ...	Apiary, Maintenance and upkeep of	...	22 41
16 ...	Livestock—Purchase and maintenance of	...	29 68
17 ...	Grants-in-aid of Agricultural Associations, Exhibitions and Competitions ...	655 50	
18 ...	Rice Grading Expenses	256 55	
19 ...	Agricultural Apprentices	116 84	
20 ...	Veterinary Preventive Measures	296 40	
21 ...	Plant Pests Preventive Measures	71 60	
22 ...	Contingencies	...	15 48
23 ..	Soil Surveys	195 07	
24 ...	Experiments with Plants of insecticidal value	101 00	
25 ...	School Gardens	258 63	
	Total	$ 2,360 07	$ 4,040 74

5. The payments into the Treasury for the year were as follows:—

Internal Revenue—Auction Duty ...	$	9 40
Agricultural Stations		3,711 55
Botanic Gardens		493 09
Sale of Official Publications		30 17
Sale of Guide Samples (Rice)		8 78
Miscellaneous—Sundries		92 18
Sundry Reimbursements		2,700 00
	$	7,045 17

METEOROLOGY.

6. The following are abstracts of the meteorological observations recorded at the Botanic Gardens, Georgetown, and at the Penal Settlement, Mazaruni, during 1934:—

Meridian of longitude for calculation of time adopted as standard in the Colony	60° W.
Hours slow of Greenwich time	3.45

Georgetown.

7. The meteorological station is situated in the Botanic Gardens at a distance of 1.45 miles south of the coast-line. The hours of observation are 7 a.m. and 1 and 6 p.m. local official time which is 3.45 hours behind Greenwich time. The height of the barometer is 6 feet 6 inches above mean sea-level.

8. During the year 1934, the air temperature in the shade as recorded by the dry bulb thermometor for the months of April, May, July to November was higher than the means recorded over the period 1846-1933. The highest temperature recorded was 89.0°F. on August 18 and 27, September 18 and 19 and October 1, while the lowest was 70.0°F. on the nights of February 5 and 6. The mean shade temperature for the year was 80.2°F. which is lower than the average from 1846-1933. The total rainfall was 81.04 inches as compared with 116.55 inches in the year 1933, and with 88.38 inches average precipitation for the past 54 years (1880-1933). The total rainfall for January was 28.00 inches, which is the highest on

record for that month, the next highest being 25.10 inches which was recorded in the year 1890. The abnormal rain which occurred on the night of January 7-8, resulted in widespread flooding. After the floods in January the rainfall for the remaining months, with the exception of October and November, was below the average. Rain fell on 208 days of the year as compared with 225 days in 1933. The evaporation from a free water surface, a six foot square tank at the ground level was 59.18 inches, as compared with a normal evaporation of 57.90 inches, the evaporation for 1934 was 73.02 per cent. of the total rainfall.

9. The total amount of bright sunshine for the year was 2,555.6 hours as compared with 2,387.7 hours in 1931 and with 2,674.8 hours in 1932, and was 82.0 hours above the average from 1846-1933. The mean radiation temperature (blackened bulb in vacuo) was 4.6°F. higher than normal, and 1.0°F. lower than that of the previous year. The maximum monthly record during the year was 150.8°F. for October, while the highest daily record 164°F. occurred on October 27.

10. The mean minimum temperature on grass was 1.1° F. higher than the average. The mean velocity of the wind was 6.99 miles per hour. The maximum velocity as recorded by the anemograph was 31.22 miles per hour at 7.40 p.m. on January 7.

Mazaruni.

11. The sub-station at the Forest Station, Mazaruni River, is in longitude 58° 38′ 45″ W. and latitude 6° 23′ 35″ N. at a distance of 42 miles south of the coastline.

12. The hours of observation are the same as the main station in Georgetown. The height of the barometer is 55 feet above mean sea level. During 1934, the mean shade temperature was 79.1° F. The maximum temperature recorded was 92.0° F. on May 20, while the minimum temperature 68.0° F. occurred on March 5, 8 and 9 and April 30. The total rainfall was 89.62 inches or 16.43 inches lower that of the previous year. The total rainfall was 8.58 inches higher than that of Georgetown. Rain fell on 224 days as compared with 208 in Georgetown. The total amount of bright sunshine recorded during the year was 1,899.8 hours as compared with 2,555.6 hours at Georgetown.

13. The following table shows the mean rainfall for 1934 in the three counties and the average rainfall for the period 1925–1934 inclusive :—

TABLE II.

MEAN RAINFALL AT COASTAL STATIONS.

Months.	Berbice.		Demerara.		Essequibo.	
	1934. Inches.	1925-1934. Inches.	1934. Inches.	1925-1934. Inches.	1934. Inches.	1925-1934. Inches.
January	11.75	7.85	27.33	7.80	26.20	7.76
February	1.31	3.96	1.88	3.92	2.12	4.59
March	3.25	4.30	3.72	4.13	1.89	2.74
April	2.36	5.89	2.82	5.53	2.52	4.53
May	3.32	10.93	3.10	11.91	4.49	12.76
June	6.98	10.48	8.79	12.32	9.34	12.60
July	14.02	9.21	11.33	10.37	10.47	11.36
August	3.59	5.17	5.56	6.56	6.84	7.10
September	3.05	2.38	2.12	2 37	4.86	3.04
October	4.33	1.65	7.29	2.48	10.90	3.06
November	2.84	2.73	4.64	3.52	5.82	4.81
December	5.09	9.19	5.98	10.75	7.58	12.20
Total	61 89	73.74	84 56	81 66	93.03	86.55

The 1934 Floods.

14. In January, 1934, a long period of wet weather culminated in floods unparalleled in the period for which rainfall records are available—that is to say during the last 70 or 80 years. Examination of the rainfall figures of the period during and immediately prior to which the major floods occurred, shows that they were few record downpours, but that the abnormal surplus of water was due rather to the steady continuance of wet weather, which filled the conservancies and put the whole of the coastlands in a waterlogged condition. This flooding, normal for a wet season, terminated in an abnormal precipitation over a period of 24 hours, which unfortunately coincided with spring tides that hampered the run off of the water. As a result widespread and serious floods occurred, the effects of which were considerably magnified on the East Coast of Demerara by breaches in the conservancy dams.

15. The year 1933 was a wet year, the total rainfall at the Botanic Gardens being 116.55 inches or 28.71 inches above the mean for the last 52 years (87.84 inches) and in December alone 27.10 inches fell. The heavy rain then continued in January 1934, reaching a climax on the night of the 7th–8th when 7.16 inches were recorded. The following table shows in detail the rainfall at the Botanic Gardens during this period :

DAILY RAINFALL AT THE BOTANIC GARDENS, GEORGETOWN, DURING DECEMBER, 1933, AND JANUARY, 1934.

December, 1933.		January, 1934.	
Days.	Inches.	Days.	Inches.
1	.07	1	.78
2	...	2	.94
3	.61	3	4.10
4	1.48	4	2.69
5	...	5	1.15
6	.03	6	1.25
9	1.33	7	7.16
8	.43	8	1.08
9	1.95	9	1.02
10	2.25	10	1.22
11	...	11	1.75
12	.67	12	1.65
13	.56	13	.28
14	...	14	.02
15	...	15	.41
16	.06	16	.52
17	5.12	17	.19
18	2.28	18	...
19	.09	19	.03
20	1.77	20	.12
21	1.14	21	.08
22	1.55	22	.22
23	1.37	23	.25
24	1.01	24	.05
25	.02	25	.22
26	.03	26	...
27	.80	27	.03
28	.16	28	.30
29	.40	29	.19
30	1.40	30	...
31	.52	31	.30
Total	27.10		28.00

The total for January—28 inches—constitutes a record for that month, but the more significant fact is that between December 17 and January 12 a period of just under four weeks, 42.45 inches of rain fell.

15. On studying the rainfall returns from different parts of the Colony, it is apparent that the abnormal rainfall of the first week in January was confined to that part of the coastlands between the Berbice and Moruka Rivers, the Corentyne Coast and the North West District receiving no excessive precipitation. It is evident also that the culminating storms fell in the Pomeroon on the night of January 6, on the Essequibo Coast on the morning of the 7th, and in Georgetown and the East Coast, Demerara, on the night of the 7th.

16. Readings from individual gauges on the coast showed some remarkable totals for the twenty-four hours during which the severest storms fell. The highest fall of all was measured at the mouth of the Moruka, 14.84 inches on the 6th being followed by 7.07 inches on the next day. Anna Regina recorded 10.37 inches and Hampton Court 12.10 inches on the 7th. The West Coast conservancy gauges at Boerasirie and Warimia showed the large cumulative precipitations of 30.75 inches and 21.28 inches respectively for the period of January 1-13 inclusive, though the readings on the 7th were not out of the ordinary. Some of the East Coast estates, however, received, like Georgetown, 7-8 inches on the night of the 7th.

17. The damage done by the floods was, of course, very considerable. The sugar industry was estimated to have lost approximately 20,000 tons of sugar in addition to considerable direct financial loss through charges for extra pumping, raising dams, and expenditure for rehabilitation works. The loss to the rice industry was severe, some of the late autumn crop was damaged by the early rains, the spring crop was almost completely destroyed, and much padi was damaged in the factories and storehouses. Ground provision areas, permanent crops and live-stock suffered equally.

18. The Agricultural Superintendents and the Government Veterinary Surgeon were immediately instructed to assist in relief works generally and to inspect and report on the extent of all losses. As soon as this was carried out, prompt measures were taken to rehabilitate the areas in which losses were most extensive with quick growing crops in order to make provision against a shortage of foodstuffs later in the year. Funds for planting material, etc., were made available from "Flood Relief Funds" as shown in the following paragraphs.

19. *Re-establishment of cultivations, etc.*—As quick maturing crops were essential, 223 bags of black eye peas were obtained from the United States of America and 50 bags of sweet potatoes from Trinidad. The black eye peas were distributed, throughout the Colony, while the potatoes were planted in nurseries in Essequibo and Demerara and cuttings or slips distributed later. Vegetable seeds were also obtained from the United States and these were distributed both as seed and seedlings. Sub-Station Cecilia on the East Coast, Demerara, was turned into a large nursery for propagation of supplies of planting material.

20. Large quantities of cassava cuttings, eddoes, yams, tannias and corn were obtained from the North West District and distributed throughout East and West Demerara, and in certain districts in the Essequibo and Berbice counties. In addition, the District Commissioners were granted certain sums of money by the Flood Relief Committee* and this was also spent, after consultation with the District Agricultural Officers of the Department, in purchasing seed padi and planting material as well as oxen to assist areas short of ploughing oxen in preparing land for the coming rice crop. Government further approved of the removal of duty on gasolene and crude oil for use with tractors engaged in ploughing rice land in the

* A full report of the work of this Committee, of which the Director of Agriculture was a member, will be found in Sessional Paper No. 6/34.

Mahaica, Mahaicony and Abary Creeks. This recommendation was made by the District Commissioner and the Agricultural Superintendent, East Demerara, and it is probably due to this last measure that such a large area of rice was planted in this area for the autumn crop. The distribution in the districts was made direct by the Department's officers as far as possible, but it was necessary in many districts for this to be done by the village overseers. The distribution of all planting material is given in a table at the end of this section.

21. *Special Flood Competitions.*—With a view to encouraging further the early establishment of ground provision areas affected by the floods, the Department inaugurated the following agricultural competitions in various districts :—

For the best cultivated mixed provision farms cultivated by each entrant to be not less than half an acre in extent.

Berbice—		
Schumacker's Lust to Ithaca	...	prizes to the value of $ 26
Bush Lot to Hopetown	...	,, ,, ,, 26
Belladrum to Tempie	...	,, ,, ,, 26
Central Corentyne	...	,, ,, ,, 26
Fyrish to Gibraltar	...	,, ,, ,, 26
East Coast, Demerara—		
Plaisance ...	...	,, ,, ,, 30
Golden Grove ...	...	,, ,, ,, 50
Beterverwagting	...	,, ,, ,, 60
Buxton ...	...	,, ,, ,, 60
Ann's Grove ...	...	,, ,, ,, 40
Victoria ...	...	,, ,, ,, 30
Mahaica ...	...	,, ,, ,, 40
West Coast, Demerara—		
Canals Polder ...	...	,, ,, ,, 80
Vreed-en-Hoop to Maripa	...	,, ,, ,, 40
North West District—		
Barima-Imbotero	...	,, ,, ,, 275
Aruka-Koriabo...	...	,, ,, ,, 325

22. Although the North West District did not suffer from the floods a special effort was made there to secure immediate additional cultivation in order to make good losses in the flood areas, thus avoiding shortage of foodstuffs.

23. The Agricultural Superintendents and Instructors of the districts visited the plots and instructions were given in connection with drainage, growing and spacing of the various crops, whilst the rules governing the competitions were explained. The results of all competitions obtained were satisfactory and the end desired generally was achieved.

24. *Purchase of Seed Padi for free distribution.*—The end of the year rains caused heavy losses to the 1933 autumn padi crop, and considerable attention was paid to the distribution of seed padi so as to ensure as near as possible a normal acreage under the 1934 autumn crop. Large stocks of selected seed were purchased and distributed free, although considerable difficulty was experienced in obtaining good quality padi of high germination test. The January floods contributed largely to this condition, ruining large quantities of stored seed padi. The figures given in the table at the end of this section indicate the distribution of seed padi purchased from Flood Relief Funds. This is entirely separate from pure seed stocks owned by the Department of which 1,499 bags were distributed.

25. *Advances to Pomeroon Farmers*—$4,000.—The Pomeroon Flood Relief Loan was granted on April 28, 1934, the sum allocated being $2,000. On June 11,

1934, a further sum of $2,000 was granted with the proviso that only the larger grant holders employing labour be given loans. Inspections by the Agricultural Superintendent were carried out on those grants which had suffered the greatest damage and loans were based on the recommendations made accordingly. Loans were made under two heads :—

(*a*) A long term loan for rehabilitating or extending coffee cultivations repayable in 5 years with interest at 6 per cent.

(*b*) A short term loan for replanting or extending provision cultivations, repayable in twelve months (at reaping time) with interest at 6 per cent.

All loans applied for with the exception of two were made under class (*a*). The total number of applications received was 115 applying for loans amounting to $13,799, far in excess of that granted by Government. There were many deserving cases and although the individual loans made were only sufficent partially to assist in re-establishing damaged areas the farmers understood the position and were grateful for the assistance received. The cultivations in this district are now in a satisfactory condition but crop prices are very low.

26. The following table indicates the distribution from Flood Relief Funds of all planting material, seed padi, etc, in the various districts. See also para. 191.

DISTRIBUTION OF PLANTING MATERIAL, ETC., FROM FLOOD RELIEF FUNDS IN BERBICE, DEMERARA AND ESSEQUIBO DISTRICTS.

	Essequibo.	Berbice.	West Demerara.	East Demerara.	East Bank.	Total,
Seed Padi—bags (140 lb.) ...	2,092*	300	...	587‡	...	2,979
Black Eye Peas—bags (90 lb.) ...	74†	20	50	79	...	223
Eddoes—bags (180 lb.) ...	23	27	11	78	.	139
Tannias—bags (180 lb.) ..	12	22	43	43	...	119
Tannia Bottoms—bags (180 lb.) ...	8	53	12	60	...	133
Yams—bags (180 lb.) ...	2	10	4	13	...	29
Sweet Potatoes (local)—bags (180 lb.) ...	7	6	...	1	...	14
Sweet Potatoes (Trinidad)—bags (180 lb.) ...	21	...	...	29	...	50
Sweet Cassava—bundles ...	75	63	30	134	19	321
Bitter Cassava—bundles ...	45	130	...	216	6	397

* Includes 638 bags purchased for District Commissioner.
† Includes 10 bags (90 lb.) sent to North West District.
‡ Includes 337 bags purchased for District Commissioner.

PRINCIPAL CROPS.

Sugar.

27. The major annual statistics covering the sugar industry for the ten years ending 1934 are shown in Table III.

TABLE III.

CANE ACREAGES, AND THE PRODUCTION AND EXPORTS OF SUGAR AND ITS BY-PODUCTS—1925-1934.

Year.	Sugar Cane Acreage Reaped. English acres.	Sugar Produced from Area Reaped. Tons.	Yield per Acre Reaped. Tons.	Exports — Sugar. Tons.	Total Value in Dollars.	Value per ton in dollars.	Rum Produced. Proof Gallons.	Rum Exported. Proof Gallons.	Molasses Exported. Gallons.	Molascuit Exported. Tons.
1925	55,676	107,580	1.93	97,728	6,785,740	69.4	1,277,900	1,148,124	1,345,243	1,268
1926	55,728	98,152	1.76	84,659	6,050,257	71.5	1,622,966	789,643	2,017,862	1,975
1927	56,534	114,030	2.01	109,616	8,787,585	80.1	1,436,010	1,081,020	2,677,457	915
1928	53,489	116,484	2.17	114,687	8,124,666	71.0	1,745,293	1,269,923	2,873,468	1,832
1929	56,126	117,254	2.08	100,449	5,943,788	59.1	1,838,353	1,109,482	2,536,623	1,803
1930	54,264*	127,764*	2.35	114,542	5,418,884	47.3	1,571,371	846,319	3,851,337	400
1931	54,999*	126,143*	2.29	119,346	5,325,755	44.6	1,002,267	722,076	7,106,997	66
1932	55,240*	148,634*	2.69	137,078	6,442,515	47.0	840,617	645,511	7,554,520	205
1933	55,811*	141,956*	2.54	127,083	5,745,151	44.9	1,239,355	883,019	8,137,233	178
1934	53,966*	132,240*	2.45	129,913	5,568,454	42.8	1,346,307	1,120,090	5,384,834	...

* Includes farmers' canes.

28. Of the total of 61,567 English acres allocated to cane in 1934, 52,194 were reaped on the estates. The yield amounted to 130,118 tons of sugar, an average of 2.49 tons per acre. In addition the estates manufactured 2,122 tons of sugar from farmers canes, of which 1,772 acres were reaped. The general average yield, including farmers canes, was 2.45 tons sugar per acre.

29. It will be noted that the total output as well as the average yield per acre are lower than in 1932 or 1933. These decreases are the direct results of the disastrous floods of December, 1933, January, 1934, and of the severe drought which followed. A full discussion of the unusual weather conditions will be found in paragraphs 7–16.

30. From information kindly supplied by the sugar estates, it appears that the area devoted to the varieties Diamond 10 and P.O.J. 2878 is being increased while that devoted to the standard cane D. 625 is being gradually decreased. The comparative figures for three years are given in Table IV. which does not include acreages under "Other Plantings."

TABLE IV.

COMPARATIVE ACREAGE UNDER D. 625, DIAMOND 10 AND P.O.J. 2878.

Variety	Year.		
	1933.	1934.	1935.
	acres.	acres.	acres.
D. 625 ...	32,964	32,703	32,429
Diamond 10 ...	5,563	8,796	13,303
P.O.J. 2878 ...	—	746	2,763

31. Of the acreage to be reaped in 1935, 55.4 per cent. is planted to D. 625, 22.7 per cent. to Diamond 10 and 4.7 per cent. to P.O.J. 2878. "Mixed" plantings still represent the rather high proportion of 12.6 per cent.

32. Returns of commercial yields obtained by the sugar estates in 1934, and kindly supplied by the managements, indicate that Diamond 10 outyielded D. 625 as first and second ratoons both on frontland soils and on pegasse. As a plant cane on frontland its yield was the same as that of the standard cane, but on pegasse soils it proved inferior to the standard cane. P.O.J. 2878 gave higher yields than either Diamond 10 or D. 625 as a plant and as a first ratoon on frontland soil. No second ratoons data are available. On pegasse it also outyielded the other two varieties as plant canes. No ratoon data are available for P.O.J. 2878 on pegasse.

33. *Research.*—The Sugar Experiment Stations' Committee comprised, at the beginning of the year :

The Director of Agriculture (Chairman).
Hon. G. E. Anderson, Pln. Diamond, E.B., Demerara.
Mr. J. C. Gibson, Pln. Port Mourant, Berbice.
Mr. A. Murison, Pln. Uitvlugt, W.C., Demerara.
Mr. James Bee, Pln. Albion, Berbice.
Mr. C. Farrar, New Amsterdam, Berbice.
Hon. M. B. G. Austin, Georgetown.

The Director of Agriculture being absent from the Colony on leave from May 1 to September 19, the Deputy Director of Agriculture acted as Chairman for the period.

34. The Hon. G. E. Anderson, having resigned from the Committee on his departure from the Colony, Mr. R. E. Rhodes of Pln. Diamond was appointed in his stead. Mr. W. H. Richards of Pln. Lusignan acted for Mr. Murison when the latter was absent from the Colony.

35. The floods took a heavy toll of the sugar experiments and no less than fifteen had to be abandoned while several others were severely damaged. The selected and imported seedlings in the nurseries also suffered greatly so that in general the work has received a setback which will retard the accumulation of data urgently required. No new canes were introduced during the year but arrange-

ments have been made to import a number of varieties through the newly established quarantine station at Trinidad.

36. Breeding work has been further extended. In the years 1929—32 some 6,200 seedlings were grown annually. In 1933, 18,974 were grown and 15,175 transplanted to the field. In 1934, 24,205 seedlings were basketed. This increase in the output of seedlings has been rendered possible by financial assistance from the Colonial Development Fund.

37. Among the 1933 seedlings transplanted to the field were 64 *Saccharum* x *Sorghum* hybrids. Attempts at back-crossing these to *Saccharum* have yielded six seedlings. At the end of the year 173 of the 1933 canes had been selected for further observation. The standard of selection can be judged by the following average figures for these selections :

Mean number of stalks per stool	...	7.46
,, weight per stool, etc.	...	27.95
,, Brix ...	...	19.53
,, weight per stalk—lbs	...	3.75

38. Considerable progress has been made in the work of multiplying, testing and selecting the large number of seedlings on hand. Thirty-eight replicated variety trials were reaped during the year and forty-two were in progress at the end of the year. As a result of trials already reaped, planters have been advised to extend Diamond 10 and P.O.J. 2878. The commercial results obtained by the estates in 1934 have confirmed the indications of the experiments. D. 118, which still covers a considerable area, either in pure stands or mixed fields, has not done well in the experiments, and planters are advised to discard it as rapidly as possible.

39. Some of the thinner canes, notably Co. 213, P.O.J. 2753 and P.O.J. 2727, have given a good account of themselves in the experiments and it is proposed to repeat some of the work with them with a view to cautious commercial extension as soon as sufficient planting material is available. There is considerable local prejudice against these canes but they have certain advantages in the field such as ease of germination, heavy stooling, sturdy ratooning, etc., and if the ones suggested maintain their early promise they are deserving of a fair trial on a commercial scale.

40. At the time of writing D. 11/28 has been compared with D. 625 five times as a plant cane and twice as a first ratoon. In four out of the five replicated plant cane trials and in both first ratoon trials it outyielded the standard cane.

41. Further work has been carried out with the root distribution of D. 625, P.O.J. 2878 and Diamond 10. It is hoped to have sufficient data for a report on the subject at the end of 1935.

42. A good start has been made in an effort to correlate cane growth with soil moisture and to determine what, if any, useful modifications could be effected in local irrigation practice.

43. Eighteen manurial experiments were reaped during the year and 29 were in progress on December 31. Part of the results have been fully described in *Sugar Bulletin No. 3* and the remainder will be considered in *Sugar Bulletin No. 4*. It will suffice to say here that planters are being advised to use 2 cwt. sulphate of ammonia per acre on plant canes on flooded frontland and to increase their present applications to 4 cwt. for the first ratoons. On pegasse lands it is suggested that they use 6 cwt. per acre both for plants and first ratoons. It is reasonably certain that the doses indicated will produce not only increased yields but increased profits.

44. Of the four flood-fallowing trials established with the aid of Imperial Funds, two were seriously damaged by the floods and it is unlikely that any conclusions

can be drawn from them. Results from the other two will be available for discussion in the next annual report.

45. Research on the cane pests of the Colony has continued, notably in respect to moth-borer and hardback control. Work on the former is being undertaken with assistance from the Colonial Development Fund to which further reference is made in para. 46 (2). Investigational work on moth-borer carried out, during the last two and a half years with the aid of this grant, has shown that different varieties of cane show differing degrees of susceptibility to attack. Canes of local parentage appear to be more attractive to the insect than do imported varieties. The present breeding policy of the Sugar Station, involving as it does crossing between promising local and imported canes is, therefore, well founded. The collection of the Amazon parasite *(Metagonistylum minense)*, discovered by Dr. J. G. Myers, and its introduction into the Colony has continued during the year with the aid of a special grant from the Sugar Producers' Association. The parasite is being bred and multiplied in the field laboratories at the Sophia Station, as well as on certain estates, and has been released at several points on the sugar belt. It has been recorded that these released parasites have completed a life cycle in the field. Further reference to this work is made in an article by Mr. L. D. Cleare, F.L.S., F.R.E.S., in Vol. V. No. 1 of the *Agricultural Journal of British Guiana* entitled "Sugar-cane Moth-borer Investigations in British Guiana: The Present Position."

46. *Grants-in-aid.*—(1) In 1932, a free grant of £900 for one year was provided from the Empire Marketing Board for the assistance of sugar research in British Guiana. This grant expired on June 30, 1933. As a result of representations made, the Colonial Development Fund Committee sanctioned a capital grant of £150 per annum and a maintenance grant not exceeding £750 per annum for a further period of two years for the continuance of sugar research in British Guiana. These grants are conditional on a sum not less than $16,000 (£3,333 6s. 8d.) being provided annually by the sugar industry of this Colony.

(2) In 1931, a free grant of £2,475 was provided from the Colonial Development Fund for three years to enable special moth-borer investigations to be undertaken. As noted previously, the Government Entomologist was seconded for this work. An additional free grant of £775 from the Colonial Development Fund was sanctioned to enable researches into the moth-borer pests of sugar-cane to be extended for a further period of nine months from July 9, 1934, and terminating on April 9, 1935. At the time of writing this report a further grant of £700 had been received from the Colonial Development Fund.

The Supernumerary Entomologist whose salary is being met from the Fund has been engaged in "Entomological Investigations" which are summarised under this head elsewhere in the report.

47. *Cane-farming.*—The annual output of cane farmers sugar during the past five years has been as follows :—

1930	...	...	1,626 tons.
1931	...	...	1,631 „
1932	...	...	2,047 „
1933	...	...	2,328 „
1934	...	...	2,122 „

The general trend is upward and the slight drop last year as compared with 1933, may be attributed to the very unfavourable weather conditions which prevailed. The industry is gradually expanding and it is confidently expected that in 1935 the output will show another important rise. The sugar estates continued to pay a minimum price of $2.20 per ton of cane, a figure well in excess of what farmers would have received if the agreed schedule had been strictly adhered to. An informal Committee was convened by the Sugar Producers' Association to discuss

and assist in adjusting points of difference which arise between farmers and estates. This committee, whose members are as follows, has already rendered very valuable service:— Hon. F. J. Seaford, (President, Sugar Producers' Association), Hon. J. S. Dash, (Director of Agriculture), Hon. J. I. D'Aguiar, (Member of Legislative Council for Central Demerara), Mr. M. B. Laing, (District Commissioner, East Demerara), Mr. W. H. Richards, (Manager, Pln. Lusignan), Mr. C. H. Palmer, (Manager, Ressouvenir Estates, Ltd.), Mr. R. H. Payne, (Manager, Pln. Enmore), Mr. W. S. Jones, (Messrs. Booker Bros. McConnell & Co., Ltd.), and two representatives of each of the villages of Beterverwagting and Buxton.

48. An effort is being made to establish nurseries of P.O.J. 2878 and Diamond 10 in cane-farming areas. Distributions of planting material of these varieties have been made from the Sugar Experiment Station and some estates have rendered much valued assistance in this direction.

Rice.

49. The area occupied by rice during 1934 was 63,227 English acres but, including the second or spring crop, the area actually reaped was 70,951 acres. The yield was returned at 881,785 bags (of 140 lb.) padi which is equivalent to 55,112 tons of padi.

50. The amount of rice exported was 14,700 tons with a value of $583,090 as against 29,120 tons with a value of $1,062,470 for 1933. This enormous decrease in the total amount of rice exported during the year is due to the heavy losses caused by the floods and to the fact that exports were temporarily suspended early in the year as a precaution to ensure sufficient supplies locally.

51. Table V. gives particulars of rice production and exports from 1925 to 1934.

TABLE V.

RICE ACREAGES, PRODUCTION AND EXPORTS, 1925-1934.

Year.	Area Reaped (Spring and Autumn Crops) English Acres.*					Yields.		Exports.		
	Berbice.	Demerara.	Essequibo.		British Guiana total acreage (reaped).	Padi tons.	Rice tons (60% yield of cleaned Rice from Padi)	Rice.		
			Mainland	Islands				Tons.	Total Value in dollars.	Value per ton in dollars.
1925 ...	17,383	10,619	9,105	4,858	41,965	38,403	23,042	6,918	523,964	75·7
1926 ...	25,112	11,588	9,837	5,580	52 117	49,899	29,939	2,914	218,146	74·8
1927 ...	20,182	14,507	13,240	5,123	53,052	59,748	35,848	11,497	723,871	62·9
1928 ...	22,028	17,886	12,356	6,182	58,452	61,144	36,686	18,033	1,114,147	61·6
1929 ...	28,121	20,962	11,023	6,636	66,742	72,096	43,257	14,091	876,407	62·1
1930 ...	26,689	18,399	10,786	7,608	63,482	64,252	38,551	22,480	1,090,385	48·5
1931 ...	29,217	34,955	10,445	8,875	83,492	78,424	47,054	23,632	1,060,339	44·8
1932 ...	29,218	37,275	12,556	8,892	87,941	84,783	50,869	28,541	1,187,871	41·2
1933 ...	27,120	37,696	13,197	9,112	87,125	63,524	38,154	29 120	1,062 470	36·4
1934 ...	24,990	31,213	6,638	8,110	70 951	55,112	31 067	14,700	583,090	39·6

* Instead of Rhynland acres in accordance with new legislation. A Rhynland acre = 1·052 English acres.

52. It will be seen that a setback has been experienced during 1934 as a result of the abnormal weather conditions referred to elsewhere in the report. The floods that destroyed about 30 per cent. of the 1933 autumn crop—which would normally be exported in 1934—were followed by drought conditions which caused a reduction in area of the usual mid-year sowings. The rice industry of British Guiana occupies the second position among the Colony's agricultural industries, the value of the export trade alone, even at the existing low prices, being well above the million dollar figure in 1933; in addition, the domestic trade is of considerable importance since rice is a staple article of local diet. This setback, therefore, although only of a temporary nature it is hoped, has been severely felt.

53. It will also be seen from the table that in 1928 a new high level of exports was reached, and in the following years new records for exports were created four

times in succession. Exports have increased by 2,976 tons per annum or at the rate of 14 per cent. annually since 1927, but there has been an annual reduction of $4.88 per ton in the f.o.b. prices or a decrease of 10 per cent. per year from 1927. These falling prices for the product have reached a point extremely discouraging to the grower, with little sign of improvement in the near future. Indeed, prices have now reached such a low level that any further decrease is likely to react unfavourably on the progress made in recent years.

54. *Research.*—At the Central Rice Station, Georgetown, an interesting phase has been reached in varietal investigations. Twenty new types were collected during tours of inspection in the districts, while ninety-one varieties were obtained from India, Egypt, Tanganyika, North Borneo, Siam and Java. All these varieties have passed through preliminary trials with the result that a large number of new types will be available for more exacting trials in 1935.

55. The sixth generation hybrids of the crosses *Americano 1600* x *Demerara Creole* and *Mexican Edith* x *Demerara Creole* are now coming true to type and will be included in the 1935 variety trials. The fifth generation hybrids from the cross *Kristnakatakulu* x *No. 79* are approaching homozygosity.

57. Variety trials were conducted at the Central Rice Station, Georgetown, and at Henrietta Experiment Station, Essequibo. At the latter centre, six varieties were tested, namely, *No. 79, Blue Stick, Lead Rice, Kalyaman, Ramcajara* and *Demerara Creole. No. 79* and *Blue Stick* were the most successful, both being significantly better than the long grained variety, *Demerara Creole.*

58. At the Central Rice Station, Georgetown, thirteen varieties were under replicated tests, namely, *No. 79, Blue Stick, Kalyaman, Demerara Creole, H. 7, Ramcajara, No. 75, No. 78, H. 6, D. 111, D. 114, Lead Rice* and *McKenzie Small.* The trials were headed by *Lead Rice, D. 114, Blue Stick* and *No. 79.* The grain characters of the *Lead Rice* preclude it from further extension as there is little demand for the "barley" type of grain. The success of *D. 114* is worthy of note as this variety approaches very closely to the Carolina type of grain and may be of value in approaching markets hitherto untapped. The variety Blue Stick has recently improved considerably in the Demerara trials owing to the selections of a strain which is immune to the leaf-spot disease caused by the fungus *Piricularia* with the result that it now produces a significantly higher yield than *Demerara Creole.* In spite of the success of the medium length varieties, the demand for a long-grained type continues, and efforts are being concentrated on the evolution of a high-yielder of the *Demerara Creole* type, to replace the old standard variety.

59. An extensive experimental programme is planned for 1935, when a chain of variety trials will be inaugurated throughout the rice growing areas of the colony. Trials will be laid down at the following centres (*a*) On irrigated land at Henrietta, Essequibo; Leguan Island; Vreed-en-Hoop, West Demerara; Georgetown, Demerara; Pln. Hope, East Demerara; and Whim, Berbice; (*b*). On unirrigated land at Pln. Ross, West Coast, Berbice; and No. 63, Corentyne.

60. Two manurial trials were laid down towards the end of 1933 and reaped in May, 1934. In the first trial a mixed fertiliser consisting of 2 cwt. per acre each of sulphate of ammonia, superphosphate and sulphate of potash was applied at different growth stages of the rice crop. A previous experiment showed that manuring the seedlings in the nursery before transplanting was of no value, so in this trial, the following five treatments were decided upon:—

Control—no manure.
Manures applied at transplanting.
Manures applied at 30 days after transplanting.
Manures applied at flowering.
Manures applied at transplanting and at flowering (*i.e.* double dressing).

Treatment.	Padi lb. per acre.	Percentage of mean.
Control	2,280	70.5
Manuring at flowering ...	2,840	87.9
Manuring at transplanting ...	3,184	98.5
Manuring 30 days after transplanting	3,720	115.1
Manuring at transplanting and at flowering	4,120	127.5
Significant Difference (P=0.05) ...	461	14.3

61. All manurial treatments gave significant increases over the control. Of the single dressings, manuring 30 days after planting gave the best results, but even this increase of 1,440 lb. per acre of padi did not cover the cost of the fertiliser.

62. The second trial, in which dressings of 3 cwt. and 6 cwt. per acre of sulphate of ammonia were tested, gave the following results :—

Treatment.	Padi lb. per acre.	Percentage of mean.
Control	1,752	69.3
3 cwt. Sulphate of Ammonia per acre	2,568	101.6
6 cwt. Sulphate of Ammonia per acre	3,256	128.8
Significant Difference (P = 0.05) ...	403	15.9

63. The dressing of 6 cwt, sulphate of ammonia per acre produced an increase of 1,504 lb. padi, *i.e.* approximately 86 per cent. over the non-manured plots, but even this increase did not cover the cost of the fertiliser.

64. These trials have demonstrated that, owing to the cost of fertilisers in relation to the very low price obtainable for padi, the application of artificial fertilisers to the padi crop is an unprofitable undertaking at the present time. It, therefore, becomes necessary to concentrate attention on improving yield by the introduction of better varieties or improved cultural methods. In this light, the following experiment is of some import.

65. *Double Transplanting of Padi.*—Briefly the technique is as follows:— Seedlings are lifted from the nursery when about four weeks old and transplanted, three or four seedlings per clump, into a bed at rather close spacing, say 5 x 5 inches. When another four weeks have elapsed, the seedlings are lifted from the bed, each clump is split into three or four and the divided clumps are planted out in the field at the normal spacing, say 8 x 8 inches. In this way, one bed will plant up five or six beds at the second planting. An experiment was conducted at the Central Rice Station to determine at what ages the first and second transplantings should take place. There were six treatments, as follows:—

Single transplanting at 4 weeks old.
Single transplanting at 5 weeks old.
Double transplanting, 1st at 3 weeks, 2nd 3 weeks later.
Double transplanting, 1st at 3 weeks, 2nd 4 weeks later.
Double transplanting, 1st at 4 weeks, 2nd 3 weeks later.
Double transplanting, 1st at 4 weeks, 2nd 4 weeks later.

66. The yields observed are shown below :—

Treatment.	Padi lb. per acre.	Percentage of mean.
1	3,000	92.0
2	2,990	91.7
3	3,170	97.3
4	3,273	100.4
5	3,523	108.1
6	3,597	110.4
Significant Difference (P=0.05) ...	369	11.3

Both treatments 5 and 6 gave significant increases in yield of 500—600 lb. padi per acre over the single transplanting. This more than covers the extra cost incurred by the process.

67. *Rice Threshing Trials.*—The Department of Agriculture has for some years been giving considerable thought to the problem of padi threshing. In Essequibo principally, the practice followed is to beat the straw on threshing tables until the padi is removed. This practice is, however, expensive in terms of human labour and probably survives only because the grains of the Blue Stick variety (which is practically the only variety cultivated in Essequibo) are easily removed from the straw. In the other rice producing districts of the Colony, padi is threshed by "bull-mashing" to which there are many objections. The rate of threshing by both methods is slow, and during harvesting, at seasons of untimely rainfall, it is advisable to thresh and place the crop under cover as expeditiously as possible. For these reasons, therefore, the Department has obtained quotations for and records of a number of types of mechanical threshers which might offer some solution to the problem.

68. In 1931, thanks to assistance provided by the Colonial Development Fund two power threshing machines (manufactured by the Bon Accord Co., Ltd., Aberdeen) were obtained by the Department both for demonstration purposes and to discover the running costs and output under British Guiana conditions. The smaller, driven by a $1\frac{1}{2}$ H.P. Petter engine on a composite bed-plate, was found to have a capacity of 850 lb. per hour or if worked 10-11 hours per day, 2,000 bags in a month, which may be taken as the duration of a normal threshing season. The market price of this unit in Georgetown is $280. The larger machine driven by a 5 H.P. Petter engine running on gas oil, was found to have a capacity of 1,600 lb. per hour or about 3,400 bags in a month. The landed cost in British Guiana of the larger unit is $868.

69. After trials were made at the Department's Central Rice Station under experimental conditions, the larger machine was given an extended trial by the Local Authority of Unity and Lancaster, East Coast, Demerara. Figures are now available as to the cost of threshing under commercial field conditions. The Authority details this cost as follows :—

Mechanic	4.4 cents per bag
Labour	4.0 „ „ „
Transportation of machine ...	1.0 „ „ „
Watchman	1.2 „ „ „
Petrol & oil	1.5 „ „ „
	12.1

The following comments on the working of the thresher are of interest :

"It is clear that, taking into consideration capital cost and depreciation, "mechanical threshing at the above rate is uneconomical. The high cost

"was, however, due to the heavy rainfall during the crop season on "account of which the work could not be properly organised. On the "other hand the machine saved a large amount of padi which would have "been irretrievably damaged by the rains."

70. During the last crop the machine was loaned to Mr. E. M. Walcott of Plantation Hope for further trial on certain front lands of the estate where 1,222 bags of padi were grown. It is reported that the work of the machine was satisfactory but figures on the cost per bag are not yet available. The Unity-Lancaster Village Authority have declined to make further use of the machine as "they consider its use more expensive than bull-mashing."

71. The indications are, therefore, that with the low ruling prices for rice, and with the comparatively high depreciation and running costs of the machine tried, a type of thresher adopted to the present needs of the industry is still a great desideratum.

72. *Pure line seed padi distribution.*—The heavy rains at the end of 1933 followed by the floods of January 1934 caused a considerable loss of high grade padi which would have ordinarily been kept for seed purposes. The loss was of a threefold nature, namely, germination and rotting in the fields, germination in the factory caused by the padi being stored damp, and wetting of the stored padi by flood water in January resulting in germination and rotting of the bottom tiers and destruction of the germ in the upper tiers by the heat generated. These conditions caused a severe setback in the extension of pure line areas, the only pure line seed available being that supplied by the Department. Large areas were again lost at the end of 1934 in the rainfall areas as a result of the excessive dry weather. The following table gives details of seed distributions during the year.

PARTICULARS OF SEED PADI DISTRIBUTION—1934.

District.	Number of Bags (140 lb.) Distributed.	
	Pure Line Seed Departmental Stocks.	Selected Seed Purchased Flood Relief Funds.
	BAGS.	BAGS.
Berbice—West Coast, Canje District, Lower and Upper Corentyne ...	205	300
East Demerara—Kitty to Mahaica	528	*587
West Demerara—West Coast and West Bank ...	188	...
Essequibo—Essequibo Coast, Wakenaam and Leguan ...	578	†2,092

73. *Grants-in-aid.*—No additional grants were made this year for the assistance of the rice industry; the funds provided during 1930 and 1931 from the Colonial Development Fund were again employed during the year under review. The original grants in connection with pure line seed were made in November, 1930:—

(*A*) A free grant of £1,700 ($8,160) to meet the cost of the erection of padi barns and the purchase of weighing machines.

(*B*) A free grant of £850 ($4,080) to meet the salary of the Plant Breeder for three years.

(*C*) A loan of £800 ($3,040) free from interest repayable at the end of five years to provide a revolving fund for the purchase and distribution of pure line seed padi.

*Includes 337 bags purchased by District Commissioner, East Demerara, but distributed by Agricultural Superintendent.
†Includes 638 bags purchased for District Commissioner, Essequibo, but distributed by Agricultural Superintendent.

74. Work on the erection of the padi barns was completed in 1931. These barns were utilised for the storage of seed grown for distribution and multiplication in the various districts.

75. The Plant Breeder has continued the supervision of the rice experimental work at the Central Experiment Station, Georgetown, which was placed under his control in 1932, and where he has been engaged in carrying out experimental and breeding work, reference to which has been made in paras. 54 to 66.

76. Owing to difficulties in connection with collection of monies due for seed supplied, the Revolving Fund was not utilised during the year for the purchase and distribution of pure line seed padi and the question of the repayment of this loan was being discussed at the close of the year under review. Other methods were adopted to encourage the use of pure line seed, including free distribution in those areas affected by the Floods, to which further reference is made in para. 72.

77. *Rice Mill and Rice Machinery.*—A grant of £1,820 ($8,736) was made on August 11, 1931, from the Colonial Development Fund for the purchase of a rice mill and various units of rice machinery.

78. Reference to the annual reports for 1932 and 1933 will indicate what has been done in this connection. A trial shipment of 50 bags of Loonzain (*i.e.*, roughly milled rice) to the United Kingdom was made by the Rice Marketing Board in February. The milling of this rice into white rice gave the following results:— Rice 71.8%, Broken 16.5% and Meal 11.7% which was considered a very satisfactory yield. It is unfortunate, however, that although every care was taken to use perfectly dry padi, free from any mustiness before milling into Loonzain, the shipment arrived in London with a musty odour which was brought about by poor storage conditions. This was inevitably reflected in the finished white rice product which had a somewhat musty odour and contained a great many yellows. This is particularly unfortunate as had it arrived in good condition it would probably have been sold at the same price as Burma Two Stars. It is proposed to make another shipment shortly.

79. *Grading.*—Further amendments were made to the Grading Regulations during 1934, the chief features of which were that they defined the limits of colour in each grade and provided that all rice should be shipped in new bags. A new grade was also introduced and called No. 1 Extra. To obtain a No. 1 Extra Certificate, rice must have a Super colour and a breakage of not more than 25 per cent. nor less than 12 per cent.

80. The method of analysing rice samples was slightly modified during the year, with a resultant improvement in the consistency of results obtained in the sampling and analysis of milled rice.

81. Table VI. gives particulars of rice exported during 1934 according to grade.

TABLE VI.

AMOUNT OF RICE GRADED IN BRITISH GUIANA—1934.

Months.	Whole Grain Super.	Super.	No. 1 Extra.	No. 1.	No. 2.	No. 3.	White Rice. A.	White Rice. B.	Broken Grains.	Super Broken Grains.	Total. Bags
January ...	...	177	...	745	932	3,301	36	16	2,003	...	7,213
February ...	...	1,816	...	6,523	8,287	13,677	50	33	5,228	116	35,730
March ...	...	1,522	...	10,151	13,3·7	14,7·7	10	72	2,444	16	42,299
April ...	...	1,199	...	3,873	6,650	11,8·0	18	78	692	...	24,320
May ...	...	729	...	1,559	1,549	5,495	...	12	727	...	10,071
June ...	...	37	...	354	1,028	3,694	...	10	751	5	5,879
July ...	...	10	...	994	1,412	6,569	...	1	553	52	9,591
August ...	...	100	...	1,287	2,514	4,043	7	3	837	...	8,791
September ...	...	195	...	852	324	7,411	3	20	577	14	9,396
October ...	25	305	1,117	124	1.996	1,476	4	5	9	...	5,061
November ...	...	1,468	2,055	671	3,556	6,897	130	...	...	...	14,777
December ...	...	1,777	1,418	832	4,161	8,792	3	35	...	...	17,018
Percentages of Grades exported	·1	4·9	2·4	14·7	24·0	46·3	·1	·1	7·3	·1	100·0
	25	9,335	4,590	27,965	45,716	87,945	261	285	13,821	203	190,146 *

* Equivalent to 14,700 tons.

Coconuts.

82. The area under coconuts in 1934 was 22,600 acres. The exports for 1934 were as follows :—Coconuts 2,487,402 valued at $32,960 ; coconut oil 12,662 gallons valued at $5,554 and copra 700 tons valued at $23,487.

83. From the figures given in Table VII. it will be seen that there has been a considerable decrease in the exports of copra and coconut oil—700 tons and 12,662 gallons were exported in 1934 as compared with 921 tons and 20,198 gallons respectively in 1933. Prices have also continued to decline and this especially so in regard to copra which fell from $84 per ton in 1929 to $44.56 per ton in 1933 and $33.55 in 1934. Messrs. Wieting & Richter, Ltd., continued to utilise this product in the local manufacture of edible oil—Fryol. The importations of edible oil into this Colony have been steadily declining since 1930 in which year Fryol came on the market. The importations for 1934 were 39,296 gallons as compared with 140,701 gallons in 1933, 144,350 gallons in 1932, 187,062 gallons in 1931 and 350,802 gallons in 1930.

84. The Copra Products (Sale and Manufacture) Ordinance which came into effect at the end of 1933, as stated in the last report, was designed to secure for the coconut producer the benefits resulting from the protection accorded the local manufacturer of edible oil by the increased duties on the imported product. Under this Ordinance the local manufacturer of copra products was compelled to pay the producer of copra or crude coconut oil the minimum price fixed by the Governor-in-Council of three cents per lb. for copra and 45 cents per gallon for crude coconut oil.

85. In order that all coconut producers should have equal opportunities to sell their copra and oil to the local factories, provision was made for the establishment of a Copra Brokers' Board constituted by Brokers licensed under the Ordinance and representatives of producers.

86. The producer delivers his copra to the broker who holds it on his account, paying him an advance, the rate of which is fixed from time to time by the Copra Brokers' Board. When a sale is made to a local manufacturer or for export each broker supplies a quota based on the quantity of copra he is holding, which quota is drawn up by the Board. Accounts are made up at the end of every quarter, and all sales of copra received during that period are pooled and an average price arrived at. This average price is distributed among the brokers who, in turn, distribute it to the producers who have delivered copra to them, less the amount they have advanced and a commission for their services of 25 cents per 100 lb. This

commission covers interest on the money advanced, storage on copra held on behalf of producers and all charges covering delivery to the local mill or to the steamer for export. It was estimated that exports of copra and coconuts in terms of gallons of oil were very little in excess of the imports of edible oil, and consequently, provision was made in the Ordinance that not more than 30 per cent. of the quantity of copra received by brokers during any period of three months should be exported during that period, in order to safeguard the raw materials of the local manufacturer.

87. At the time the Ordinance came into force the world price of copra had fallen to around £9. 10s. per ton, equivalent to $1.34 per 100 lb. f.o.b. It was therefore assumed that if the maximum of 30 per cent. had to be exported at this price and the balance was purchased by local manufacturers at three cents per lb., the nett return to the producer, after deducting the 25 cents per 100 lb. repayable to the broker, would be $2.25 per 100 lb. which would have been an improvement on the world price of 89 cents per 100 lb. Unfortunately, however, it is being claimed that a number of illegal operators began the manufacture of crude oil, who neither paid the full price for their copra or their oil, nor paid the excise duty prescribed by the Ordinance, in consequence of which the licensed factories were unable to compete and consequently could not use the copra which accumulated in the hands of the brokers. This was not noticeable in the first quarter of the year, and during that period the arrangement worked very satisfactorily. Despite heavy deliveries to brokers, the Demerara Oil and Cake Mills, Ltd., were able to take 62.5 per cent. of brokers' holdings and the balance had to be exported, and the average price to the producer worked out to $2.17 per 100 lb. instead of the anticipated $2.25. In the succeeding quarters the position became gradually worse until in the December quarter the Mill took no copra at all and the whole of brokers' receipts were exported. Nevertheless, the benefit to the producer amounted to roughly 32 cents per 100 lb. of copra delivered to brokers throughout the year under review.

88. From the beginning it was made clear by Government that on account of the inherent difficulties of working such an Ordinance and in view of the large number of small producers in the Colony—even then coconut oil manufacture was a thriving village industry—legislation would only be enacted if Government was relieved of all responsibility in connection with the financial side of its operations and this was readily accepted by those concerned. Actually, too, a large proportion of the population is not greatly concerned as to whether the oil consumed is refined or not, cheapness being of far greater consideration.

89. It was also manifest that production figures had fallen, doubtless as a result of poor prices, which were no incentive to growers to collect nuts and tend their groves and this was stressed at the time. With the stimulus provided by protection it was equally to be expected that increased activity in the industry generally would result. Therefore, taking all these facts into consideration it was realised that defects would be discovered and that such an Ordinance could only be regarded in the light of a trial in dealing with an abnormal situation arising out of disturbed economic conditions. That the idea is theoretically sound and that the coconut industry is in dire need of assistance, there can be no doubt. Unquestionably, however, the practical difficulties which have arisen in connection with the operation of the Ordinance are not easy to overcome. At the end of the year the position was causing considerable anxiety both to the trade and to Government.

90. The year 1934 was marked by an almost complete absence of outbreaks of the coconut caterpillar (*Brassolis sophorae* L.) on the coconut estates. Sporadic and localised attacks occurred in Georgetown and on one or two areas on the East Coast, Demerara, but these were shortlived and caused but little damage to the trees. A few of the more enterprising and progressive estates maintained control

gangs during these slight outbreaks but as usual most of the proprietors adopted a policy of "*laissez aller*."

91. Table VII. gives particulars of coconuts, coconut oil and copra during the period 1925-1934.

TABLE VII.

COCONUT ACREAGES, AND THE PRODUCTION AND EXPORTS OF COCONUTS AND ITS BY-PRODUCTS—1925-1934.

Year.	Acres under cultivation (English)* acres.	No. of Nuts Exported.	Value in Dollars.	Copra Exported, tons.	Value in Dollars.	Coconut Oil Exported gallons.	Value in Dollars.
1925	31,434	1,363,280	34,303	864	96,110	30,394	30,601
1926	27,880	815,917	18,739	706	190,055	18,778	18,620
1927	29,235	334,185	6,019	1,163	116,525	25,326	25,271
1928	29,456	321,635	5,939	3,501	352,522	26,244	24,426
1929	29,456	637,812	10,614	3,759	314,350	20,862	16,730
1930	28,052	629,371	7,845	2,010	143,423	26,377	16,059
1931	22,882	1,494,195	13,538	1,381	82,629	20,742	9,254
1932	23,301	962,364	10,484	757	48,936	19,048	10,239
1933	23,452	1,698,175	22,925	921	41,045	20,198	8,904
1934	22,600	2,487,402	32,960	700	23,487	12,662	5,554

* Instead of Rhynland acres in accordance with new legislation. A Rhynland acre = 1.052 English acres.

Coffee.

92. The area under coffee in 1934 was 4,217 acres. The exports were 317 tons of cured coffee valued at $47,238 as against 510 tons valued at $79,594 in 1933. The exports in 1933 were the highest recorded and the 1934 exports, although lower, were higher than the average of any period prior to 1929. Coffee shipments took place to the greatest extent from December to May and were substantially affected by the heavy rains at the end of 1933 and early 1934. The flood conditions which resulted in January, 1934, damaged and in some cases destroyed considerable coffee areas in the Canals Polder, Demerara, and in the Pomeroon. In addition, British Guiana's coffee is exported mainly to the northern European countries and the unsettled political and monetary situation in Europe throughout the year is considered to have depressed foreign trade in general and to have affected the demand for coffee.

93. The Liberian species is the chief type now cultivated throughout the Colony, although records indicate that Arabian or "Creole" was once extensively planted. The crop continues to prove the most satisfactory on the acid, pegasse areas of the Colony.

94. During the year, the Department inaugurated a system of weekly recording of prices of the chief local agricultural commodities. The prices, including those of coffee, were telegraphed regularly to the North West District which is the area furthest removed from the Georgetown Central market.

95. Table VIII. shows the acreage, exports and values of this crop from 1925-1934.

TABLE VIII.

COFFEE ACREAGES, EXPORTS AND VALUES—1925-1934.

Year.	Area cultivated (English) acres.*	Exports.	
		Tons.	Total Value in Dollars.
1925 ...	6,569	298	114,593
1926 ...	5,499	345	132,623
1927 ...	5,546	192	68,844
1928 ...	6,201	410	137,933
1929 ...	6,212	405	104,135
1930 ...	5,363	164	22,400
1931 ...	4,899	355	33,582
1932 ...	5,800	470	69,436
1933 ...	4,630	510	79,594
1934 ...	4,217	317	47,238

* Instead of Rhynland acres in accordance with new legislation. A Rhynland acre = 1.052 English acres.

MINOR CROPS.

Pineapples.

96. Reference has been made in previous reports to the establishment of, and the efforts made by, the British Guiana Fruit & Canning Company at their concessions at Dalgin on the Demerara River. During the year the Department has given a considerable amount of assistance to this company, both in the field and in the factory.

97. In the field a second manurial trial has been established to investigate the economics of applications of slowly available fertilisers in the early stages of growth, of dressings of mixed fertilisers during mid-growth, and of applications of manures at blossoming. The results should be available for inclusion in the next annual report.

98. A pot experiment with pineapples has been commenced and entails the reaping and analysis of plants of definite periods. The investigation is already yielding information which should be of great value in deciding the most paying composition, amount and time of application of artificial fertilisers to the crop.

99. Frequent visits have been paid to the concession by the Supernumerary Entomologist in connection with insect pests. Members of the Chemical Division have studied methods of control in the factory and have carried out an investigation of the use of the hypodermic needle and refractometer in assessing the ripeness of fruit.

100. There can be no doubt that the venture is still in an experimental stage and it is a great pity that the company decided to erect a factory before solving the many field problems which have presented themselves. It seems that there has been a reduction in the amount of 'browning' experienced during the year but the production of large-cored and unevenly ripened fruit still persists.

Citrus.

101. The area under citrus and other fruit was 535 acres exclusive of limes.

102. The distribution of budded plants from the Botanic Gardens nurseries was continued, but the number was less than in the previous year. As explained in the report for 1932, a year of large output is followed by a year of small output, owing to the limited capacity of the nursery. In future, however, it is hoped that the demands on the Botanic Gardens nurseries will not be so large, as several persons who had placed big orders were persuaded to grow their own nurseries, the Department giving every assistance with the layout of the nursery and planting of the stocks, and later on with budding.

103. The experimental orchard at Hosororo bore a good crop from the end of the year, and the quality of the grapefruit was extremely good and showed an improvement on the initial crop of the previous year. A careful record is being maintained of the quantity and quality of the fruit from each tree. The grapefruit, though rather large, is of good flavour. The oranges on the other hand, though sweet and juicy, tended to be small. The trees at Hosororo should soon be able to supply us with the greater part of our budwood requirements. In the meantime the Trinidad Department of Agriculture have responded most generously to our demands.

104. Table IX indicates the distribution of citrus plants during 1932-1934.

TABLE IX.

DISTRIBUTION OF CITRUS—1932-1934.

	Demerara.			Berbice.			Essequibo.			North West District.			Total Distribution.		
	1932.	1933.	1934.	1932.	1933.	1934.	1932.	1933.	1934.	1932.	1933.	1934.	1932.	1933.	1934.
Budded Oranges ...	118	1,524	363	210	216	51	66	132	534	...	600	176	394	2,472	1,124
Budded Grapefruit ...	134	709	353	229	427	66	50	22	245	386	224	114	813	1,382	778
Budded Limes ...	...	...	100	...	...	...	...	...	...	1,195	497	426	1,195	497	526
Seedling Limes ...	3,200	...	...	...	...	...	...	...	...	3,021	268	236	6,221	268	236
Total ...	3,472	2,233	816	439	643	117	116	154	779	4,596	1,589	952	8,623	4,619	2,664

105. The area under limes during 1934 was 541 acres—a decrease of over 300 acres on the previous year. This is in a great measure due to the floods which destroyed large acres of all classes of agricultural crops. The exports of concentrated lime juice for the year were 10,468 gallons valued at $2,013 as against a nil return for 1933, and 892 gallons of essential oil of limes valued at $32,967 as compared with 1,166 gallons valued at $65,014 in 1933—the record year for exports of this commodity. Some 526 budded limes and 236 lime seedlings were distributed from Hosororo during the year there being a small lime factory in the North West District. Some 30,000 galllons of raw lime juice was turned out by this factory.

106. Table X gives statistics bearing on the citrus industry.

TABLE X.

CITRUS ACREAGES, AND EXPORTS AND VALUES OF CONCENTRATED LIME JUICE AND ESSENTIAL OIL OF LIMES—1925-1934.

Year.	Area under limes (English) acres.*	Area under other Citrus (English) acres.	Concentrated Lime-juice Exported. Gallons.	Value in Dollars.	Essential Oil of Limes Exported Gallons.	Value in Dollars.
1925 ...	689	...	8,430	12,130	306	146
1926 ...	689	...	4,974	7,156	277	144
1927 ...	705	...	5,249	7,559	273	14,175
1928 ...	695	...	8,124	7,799	440	23,316
1929 ...	635	...	12,717	12,019	801	47,585
1930 ...	740	...	11,373	10,855	660	38,352
1931 ...	747	254	8,347	8,014	590	39,806
1932 ...	787	316	958	920	730	44,728
1933 ...	869	328	Nil	...	1,166	65,014
1934 ...	541	335	10,468	2,013	892	32,967

* Instead of Rhynland acres in accordance with new legislation. A Rhynland acre = 1.052 English acres.

Bananas.

107. Proposals for the building up of an organised banana export industry received much attention and attracted a great deal of discussion during the year. The extensive area in Central America and Jamaica, previously cultivated in bananas but now rendered unproductive by Panama Disease, have caused fruit growing firms to look elsewhere for sources of supplies. Following discussions during the West Indian Fruit and Vegetable Conference held at Jamaica in 1933, and at the request of the Director of Agriculture, Mr. N. E. Sanderson and Dr. V. C. Dunlap (representing the United Fruit Company) visited the Colony for a period of about two months in order to investigate the possibilities of the establishment of a local banana industry. The Company later reported (in a letter dated July 10, 1934) that conditions were considered unfavourable for banana extension. As a result of their findings contracts were not made between the Company and local banana growers, as has been the case in the Caribbean Islands.

108. As there was a scarcity of 'Gros Michel' planting material the Department established nurseries at the Demerara, Berbice and Essequibo Stations for the multiplication of suckers of this type with a view to extension if conditions justified. The collection of suckers for establishing the nurseries was not easy on account of

the greatly depleted supplies of planting material caused by the floods in the districts. In addition, suckers could only be collected under the personal supervision of the District Agricultural Officers, in order to ensure that they were true to type. At Plantation Dunoon, Demerara River a large scale trial is being made with Gros Michel bananas in co-operation with the proprietor of the estate. The writer feels that success is more likely to be achieved in the river areas within relatively easy reach of Georgetown.

109. At the end of the year the possibility of banana extension received still further attention on account of the offer made by Messrs. J. Lauritzen, a Danish Steamship Firm, to provide space for regular shipments of dwarf or Cavendish bananas to Europe. The Company did not propose to purchase the fruit but were interested only in transport. A preliminary but important point which awaited settlement at the end of the year was that of freight charges, because on the basis of ruling London quotations the prices which would remain for the grower, after deduction for freight at the figure proposed by the shipping company, were definitely unattractive. The handling, packing and transportation of Cavendish bananas even under the best of conditions present considerable difficulty. Information is, however, available as a result of experiments in other Colonies and the Department is, therefore, in a position to advise growers and shippers in regard to handling methods, if and when a satisfactory price agreement is arrived at between producers and any marketing agencies which may be created. The first essential is to arrange for trial shipments which are now under consideration.

110. The District Agricultural Officers have made a careful study of existing scattered cultivations with a view to obtaining reliable figures in regard to planting material available. Such figures will be particularly useful also for providing estimates in regard to supplies, notably for shipping tests, as there is practically no organised cultivation of bananas carried on in the Colony. At the time of writing, all questions relating to the possibility of a banana industry in the Colony were receiving the attention of the recently appointed Advisory Board of Agriculture.

Provision Crops.

111. The area under ground provisions (a name used collectively for plantains, bananas, corn, cassava, sweet potatoes, tannias, yams, etc.) was 16,450 acres as compared with 16,635 acres in 1933 and 17,135 acres in 1932. Reference has already been made to the damage and losses caused by the January floods and for a time the supply of planting material was very limited. Competitions were started with the object of encouraging the early establishment of quick growing crops and the ensuring of a food supply ; the response to this was satisfactory. Advantage was taken of the period of re-establishment to encourage farmers to segregate their crops instead of planting them in mixed cultivations as is generally practised.

112. Two tons of good quality black eye peas were imported from the United States Department of Agriculture and distributed. The cultivation of other types of peas and beans is not expanding at the rate desired, slow but steady progress is, however, being made. The area under sweet potatoes continues to show an increase —the Black Rock, a Barbados variety, is the most popular. There is a marked improvement in the quality of fresh vegetables grown as farmers are at last realising the value of using good seed. As a result of continuous trials, the Department is now in a position to recommend those varieties most likely to succeed and the drug firms of Messrs. Brodie & Rainer and Booker Bros. stock seeds approved by the Department.

Apiculture.

113. The interest awakened in this minor ind ustry during recent years has not only been maintained in 1934 but increased. The honey collection during the two periods of honey flow, *i.e.*, the end of the January-February rains and at the end of the August-September rains, were favourably reported on in all districts of the

Colony and the 1934 honey crop was one of the biggest, if not the biggest, in the history of the industry.

114. Honey has thus far been produced solely for local consumption but at the end of the year stocks had so increased that the Department of Agriculture found it necessary to make investigations in regard to an export trade and in this connection the Secretary of the West Indian Committee rendered valuable service. The following report was obtained on samples sent to England by the Department:—

"No. 1 Liquid palish amber of fair flavour ... 28s.
No. 2 ,, amber ,, ,, ... 26s.
No. 3 ,, darkish amber ,, ,, ... 25s.
c.i.f. London.

"As usual the darker the colour the stronger the flavour.

"Regarding the packing, we recommend barrels containing 3 to 3½ cwt. "each, but in case of need casks containing 5 to 5½ cwt. each or, if "absolutely necessary, cases each 2 x 56 lb. tins. On no account should "metal drums be used.

"If tins in cases unavoidable very great care must be exercised in "cleansing the tins if previously used and in preventing any solder "dropping into the Honey.

"We have ascertained that the prices quoted for the British Guiana "Honey, are about the same as those quoted for Jamaica Honey but it "has been pointed out to us that difficulty might be experienced in "introducing Honey from a new source at top prices."

115. The increased output of honey must be attributed not only to the satisfactory honey flows but also to the better condition of hives. Extension work in connection with bee-keeping now forms a definite phase of the Department's programme and practices in all districts of the Colony are being brought more into line with modern concepts. Better honey storing is also due to the improved strain of bees in the Colony. The Department has continued to introduce new blood in the form of purely mated pure-bred Italian queens and progeny from these sold at attractive prices to beekeepers. The pure-bred queens distributed were in 1932—49; in 1933—53 and in 1934—92.

116. During the year, Mr. H. D. Huggins, Agricultural Superintendent, paid visits to East and West Demerara, Berbice and Essequibo in connection with bee-keeping. Satisfactory results were obtained and the visits were highly appreciated by those interested.

117. There were also inaugurated during the year, a scheme for the supply by the Department's Demonstration Apiary of nucleus colonies to beginners and others desirous of increasing hive numbers. Although there has been the tendency for the number of hives per beekeeper to increase under the scheme, not as large a number of hives were applied for from the Department as was anticipated. This was attributed to the fact that the unusually good honey flows during the year made it specially easy for beekeepers to divide and build up their hives rapidly and with little inconvenience.

118. Three hives placed on scale have been weighed daily as from May 8, 1934. Data on the weight changes of the hives and on rainfall, which is the chief factory affecting seasonal honey flows, are being recorded. The results indicate that even during some periods of moderately heavy rainfall honey continues to be stored but the period is too short to make any but tentative inferences.

119. The condition of the hives at the Apiary was very much more satisfactory at the end of the year than at the outset due mainly to the fact that a small revolving fund of $50 was provided and it was, therefore, possible to make replacement when hives had been depleted and weakened by rapid queen-breeding operations.

120. The British Guiana Beekeepers' Association, with whose activities the Department of Agriculture is closely associated, had a successful year and at the end of 1934 there were forty-nine members.

Cacao.

121. The area returned under cacao was 812 acres. There is still a demand for seedlings among farmers, and orders for several hundred plants have been placed from various districts at the Botanic Gardens nurseries.

122. At the request of the Trinidad Department of Agriculture, a search has been made during the year for any trees which may appear to be immune or resistant to Witchbroom. It has proved, however, a difficult matter as the small proprietors who own most of the cacao have no tree records or knowledge of individual trees on their land, and several trees pointed out as free of Witchbroom were subsequently found to be affected. One or two more promising trees, however, are still under observation.

123. Table XI. shows the area under cultivation and the imports of this commodity from 1925-1934.

TABLE XI.

CACAO ACREAGES, IMPORTS AND VALUES OF RAW CACAO AND PREPARED CACAO—1925-1934.

Year.	Area cultivated (English) acres.*	Cacao exported. lbs.	Cacao—Imports.			
			Raw Cacao. lbs.	Value in Dollars.	Prepared Ground. lbs.	Value in Dollars.
1925 ...	2,021	none	5,345	431	212,961	36,228
1926 ...	1,356	,,	10,216	1,468	163,869	27,090
1927 ...	1,322	,,	10,874	1,663	155,565	29,860
1928 ...	1,265	,,	3,367	423	150,393	27,404
1929 ...	1,514	,,	4,834	539	119,134	19,722
1930 ..	1,514	,,	6,201	637	108,081	18,108
1931 ...	953	,,	9,624	800	121,961	18,250
1932 ...	791	,,	1,147	87	70,764	12,139
1933 ...	797	,,	163	18	109,092	15,187
1934 ...	812	787	3,832	279	106,201	16,033

*Instead of Rhynland acres in accordance with new legislation. A Rhynland acre = 1.052 English acres.

Tobacco.

124. During the year distribution of selected seed was continued by the Department. Many applications were received and as much help as possible was given by the District Agricultural Officers to persons making trial with the crop.

125. The offer of the British Guiana Match Factory of cash prizes and the attractive purchase prices for cigarette tobacco tended to maintain interest in this type of leaf. The heavy rains at the end of 1933 and early in 1934 destroyed most of the tobacco planted, so that despite the competitions, the total amount of tobacco produced during the year was comparatively small.

126. Three (3) lb. of seed and 398 plants were distributed from the Experiment Stations during the year.

Para Rubber and Balata.

127. The area returned under Para Rubber was 873 acres as compared with 681 acres in 1933. Owing to the low prices paid for rubber and the universal presence of Leaf Spot Disease this crop can no longer be considered amongst the Colony's exports.

128. The exports of Balata *(Mimusops Globosa)* were 248,542 lb. valued at $70,299 as compared with 479,573 lb. valued at $127,529 in 1933. The market for this product has become very restricted in recent years.

MISCELLANEOUS CROPS.

Forage Crops.

129. Several new fodders were introduced during 1934, viz., *Lespedeza sericea*, *Korean Lespedeza*, *Robe Lespedeza* and *Common Lespedeza* received from the United States Department of Agriculture and *Paspalum dilatatum* and *P. virgatum* from the School of Agriculture, Natal, South Africa. The cultivation by cattle owners of Guatemala Grass is steadily increasing while there is also a fair demand for Demerara Primrose. The latter grows well in semi-shade but gives a poor and stunted growth when grown in the open.

130. During the year under review 1,920 cuttings of the various fodder crops were distributed.

Green Manures and Cover Crops.

131. In the report for 1933 mention was made of experiments being undertaken to determine the value of these crops in annual crop-practice and their suitability for planting between permanent crops. Three varieties were mentioned as giving promise for planting under coconuts and 'orchard crops' (such as coffee, citrus, etc.) viz. *Dolichos hosei*, *Calapogonium muconoides* and *Indigofera endecaphylla*. This latter variety is undoubtedly the most promising; in previous years this legume has been a very shy seeder but this year it seeded freely. The Rice Bean, *Phaseolus calcaratus*, obtained from the Department of Agriculture, New South Wales, has been added to the collection and appears to be a very promising cover crop.

132. Experiments are in progress to discover a suitable leguminous cover crop for rice fields which will not only enrich the soil but will inhibit the growth of weeds during the "off" season. Two species of Sesbania were introduced, namely, *S. speciosa* through Kew and *S. aegyptiaca* from the Imperial College of Tropical Agriculture, Trinidad. These two species have not proved very successful owing to their inability to compete with the quick growing sedges in the easily stages of growth.

133. Very satisfactory results have been obtained with a legume identified as *Vigna repens* which was found growing wild about the Experiment Station, Georgetown. It is easily established by cuttings and rapidly smothers the weeds. An added advantage is that it may be used to cover the ground for an indefinite period. A plot was established in May 1934 and in three months time had taken over the entire plot. It has now been growing for nine months and will be used in a green manurial trial during the coming autumn crop. A plot cut in 1933 gave an equivalent of about 10 tons of fresh material per acre.

A fair quantity of seed totalling 228 lb. has been distributed from the Experiment Stations during the year.

Poison Plants.

134. The Haiari cultivation trials in the North West District were continued, the more vigorous growth of both black and white varieties in the open than under shade becoming very marked. The white Haiari in the open at Wauna Sub-Station had become almost thick enough to smother the weeds, and the Black Haiari, which under similar conditions had not appeared so vigorous as the White, now seems almost to equal it in rate of growth.

135. Dr. W. A. Archer, Botanist, United States Department of Agriculture, spent some four months in the Colony, principally with the object of studying rotenone producing plants. In this connection he made several visits to the North West District and the Forestry Station, Mazaruni. The Department was able to assist him in several directions, and he was afforded full facilities for carrying out laboratory work in the Herbarium.

CENSUS RETURNS.

136. Tables XII and XIII show the number of acres under cultivation during 1934 in the three counties of the Colony and also summaries for the period 1925-1934.

Table XII.

CROP ACREAGES IN BERBICE, DEMERARA AND ESSEQUIBO COUNTIES, 1934.

Counties.	Nature of Crops and number of Acres under cultivation on December 31, 1934. (English acres).								
	Sugar Cane.	Rice.	Coconuts.	Coffee.	Rubber.	Cacao.	Limes.	Citrus and Other Fruit.	Ground Provisions.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Berbice ...	22,632	24,990	3,205	...	...	156	250	37	2,842
Demerara ...	38,483	28,456	14,409	1,587	656	463	38	211	10,691
Essequibo ...	452	9,781	4,986	2,630	217	193	253	87	2,917
Total ...	61,567*	63,227†	22,600	4,217	873	812	541	335	16,450

* Includes area under farmers' canes—1,772 acres.
† Does not include acreage for the Spring Crop—7,724 acres—which is grown on the same land.

Table XIII.

SUMMARIES OF CROP AVERAGES—1925-1934.

	Year.	Annual Summaries of the Acreages under cultivation during the years 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933 and 1934 together with the acreages reaped for the same period for sugar-cane and rice. (English acres).*											
		Sugar Cane.		Rice.		Coconuts.	Coffee.	Cacao.	Rubber.	Limes.	Other Citrus.	Maize, Plantains, etc., and Ground Provisions.	Total area under cultivation.
		Area cultivated.	Area reaped.	Area cultivated.	Area reaped.								
British Guiana	1925	57,500	55,676	30,858	41,965	31,434	6,569	2,021	2,315	689	...	12,324	143,710
Do. ...	1926	58,589	55,728	34,504	52,117	27,880	5,499	1,356	2,104	689	...	15,264	145,885
Do. ...	1927	59,271	56,534	39,283	53,052	29,235	5,546	1,322	1,895	705	...	14,576	151,833
Do. ...	1928	57,625	53,489	46,667	58,449	29,456	6,201	1,265	1,683	695	...	16,336	159,928
Do. ...	1929	57,247	56,126	55,745	66,742	29,456	6,212	1,514	1,474	635	...	14,283	166,566
Do. ...	1930	57,244	54,264	52,287	63,482	28,052	5,363	1,514	1,474	740	..	14,312	160,986
Do. ...	1931	61,097	54,999	77,478	83,492	22,882	4,899	953	827	747	254	17,575	186,712
Do. ...	1932	62,905	55,240	73,453	87,941	23,301	5,800	791	880	787	316	17,135	185,368
Do. ...	1933	63,093	55,811	72,161	87,125	23,452	4,630	797	681	869	328	16,635	182,646
Do. ...	1934	61,567	53,966	63,227	70,951	22,600	4,217	812	873	541	335	16,450	169,622

* Instead of Rhynland acres in accordance with new legislation. A Rhynland acre = 1.052 English acres.

ANNA REGINA ESTATES—BUSH LOT LAND SETTLEMENT.

137. The Anna Regina Estates *cum annexis* have been leased for three years to Mr. Parikhan Rai. A proper lease was drawn up by the Crown Solicitor and duly executed. Excluded from the lease are; the Bush Lot Land Settlement, Henrietta Experiment Station, rice mill, factory, storage buildings, etc.

138. The floods of January, 1934, completely destroyed the spring crop at Bush Lot whilst the lack of water for planting the autumn rice crop, brought about by a breach in the Tapacooma Lake, caused a reduction in the total acreage planted. As a result revenue from rent collections suffered.

139. The District Agricultural Officer continues to have charge of the settlement and of Government interests generally in the Anna Regina properties.

Essequibo Commission.

140. His Excellency the Governor Administering the Government on December 31, 1934, appointed a Commission to enquire into the position which will

be created on the Essequibo District if Plantation Hampton Court were abandoned as a sugar estate. The members of the Commission are :—

Director of Agriculture,	Chairman.
The Director of Public Works,	Members.
Hon. T. T. Smellie, O.B.E.,	
Hon. E. A. Luckhoo,	
Hon. F. J. Seaford,	
Hon. R. V. Evan-Wong, B.Sc.,	
G. M. Eccles, Esq.,	
Abdool Rayman, Esq.,	
with	
F. Burnett, Esq., M.C.,	Secretary

141. The following are the terms of reference :—

(1) To enquire into the position which will be created in the Essequibo District if Hampton Court were abandoned as a sugar estate.

(2) Whether other sugar estates would be prepared to give employment to labourers resident on the Essequibo Coast who will be thrown out of employment if Hampton Court is abandoned ;

(*a*) in approximately what numbers per annum and the seasons during which the labour will be required ;

(*b*) whether other estates would be prepared to establish families from the Essequibo Coast on their estates.

(*c*) the rate of wages which should be paid for seasonal labour having regard to the fact that the labourer from Essequibo or elsewhere not resident on an estate will have to be able to maintain himself and his family wherever their home may be.

(3) What assistance, financial or otherwise, Government should give to enable estates to erect the necessary buildings :

(*a*) to accommodate seasonal labour.

(*b*) cottages for families.

(4) In what manner Government could assist, financially or otherwise, in the cost of transporting labourers from the Essequibo District or elsewhere in the Colony to the estates.

(5) To examine and report upon the effect any considerable emigration from the Essequibo District will have on the interests of proprietors in that district and whether their ability to pay

(i) capital cost of drainage and irrigation schemes,

(ii) charges for maintenance of these schemes,

(iii) sea defence rates, will be affected, and if so to advise whether in this connection relief, and if so to what extent, should be given to the proprietors and others in the district.

(6) To examine and advise upon any other matters of importance which may arise during the course of the enquiry.

CO-OPERATIVE CREDIT BANKS.

142. The Credit Banks continued under the Chairmanship of the District Agricultural Officers, while the duties of Registrar and Auditor are performed by Mr. W. G. Delph who is attached to headquarters staff.

An Ordinance (No. 28 of 1933) to make better provision for the constitution and management of Co-operative Credit Banks was passed by the Legislative Council on August 30, 1933. Under Section 3 (1) of this Ordinance the Governor shall appoint for the general superintendence of all banks a Board to be styled "The Co-operative Credit Banks Board." The Board shall consist of five members one of whom shall be the Director of Agriculture. Under Section 3 (2) the Director of

Agriculture shall be the Chairman of the Board and shall preside at its meetings, the Registrar being Secretary.

143. There were on December 31, 1934, twenty-seven banks on the register—15 in Demerara, 8 in Berbice and 4 in Essequebo. Three of these banks are non-functioning. At the close of the year the membership of the remaining 24 banks was 10,629; West Indians owned 46,686 shares and East Indians 27,715 out of a total issue of 80,219.

144. The lending capital of the banks is derived from two main sources—share capital subscribed by members and Government loans, the balance due to Government being $26,246.40 at December 31, 1934.

145. Loans are made by the Credit Banks to members only and these are chiefly small agriculturists, with valid security, raising crops of padi, sugar cane, ground provisions, etc. Some business is also done with persons engaged in coconut oil manufacture, pig-keeping, cow-keeping, huckstering, diamond seeking, etc. Money is also lent for repair of buildings and for purchase of properties.

146. In the following table a comparison of the business done in 1933 and 1934 by all the banks in the Colony is made:

Year.	Number of Loans made.	Amount Lent.	Loans Recovered.	Interest Collected.
1933 ...	865	$ 24,601 51	$ 23 894 55	$ 8,241 42
1934 ...	671	20,144 71	20,067 29	8,082 41
Decrease ...	194	$ 4,456 80	$ 3,827 26	$ 159 01

147. Under the "Rules for Co-operative Credit Banks" provision is made for the building up of reserve funds out of profits on the basis of 4 per cent. per annum on the paid-up capital of a bank at the end of its financial year. The total amount of investments carried out by the banks in this connection at December, 31, 1934, was $33,324.97 and, in addition, $1,244.72 was further allocated by the various banks for 1934 to be invested later. There is also a Secretaries' Guarantee Fund in connection with the banks which stood at $3,411.41 at the end of 1934.

148. The position of the Wakenaam, Leguan, Den Amstel, Fellowship, Beterverwagting-Triumph and Eldorado Block Co-operative Credit Banks has not improved. These banks are still in a bad way on account of various causes and will not be able to meet in full their indebtedness to Government.

AGRICULTURAL ECONOMICS.

149. In this, as in other Agricultural Departments, work in directions such as soil studies, the biological sciences and extension has been well organised before work in agricultural economics began or was even seriously contemplated. Nevertheless, here as elsewhere, a distinct need has arisen within recent years for reliable and understandable information in regard to market prices, relative costs of production, wages in relation to prices, employment of labour, cost of living, etc. The need for data of this kind has been felt by Department and voiced by commercial interests concerned with the business of local agriculture.

150. An officer suitably trained now being available, in 1933 a definite start was made with economic studies and the scope of the work was extended and increased during 1934. It is to be pointed out that this work was undertaken with a clear-cut policy in mind. No academic research of purely long-range interest has been or is being attempted. All data collected are calculated to throw light on questions that have already been the subject of colonial discussion or thought.

151. A system of weekly price recording for locally grown productsw as initiated. Not only are these prices of value for record and reference purposes, but outlying districts are informed by telegram of price changes so that producers are now provided with an independent check on sales reports submitted by market agents. There has been much complaint in the past from producers in the districts who claimed that agents, to whom produce was sent for sale on a commission basis, did not remit the full benefit of market prices. This price supply service is planned to ensure for the producer more reliable market reports. There is also on record prices on export markets (reduced to an f.o.b. basis) of those agricultural commodities whose export trade warrants; these f.o.b. quotations are submitted for Government's information.

152. A study was made of the prices of the chief agricultural commodities and index numbers calculated for the period 1910-1933. Further, weighted annual index numbers were prepared so that a single figure might be obtained to indicate the comparative economic situation for each year. Prices of a large variety of articles entering into the local cost of living were also collected for as long a period as records would permit (in most cases from 1919 onwards) and a weighted index of cost of living obtained. Wages were similarly studied for eight classes of wage-earners so that an indication might be obtained of the relative changes that had taken place in local wages and in prices received for commodities produced.

153. A survey questionnaire was prepared and a house to house survey carried out in the rice-farming district of West Demerara. One of the chief objects of this survey was to determine the size of cultivation with the highest average labour incomes. Other considerations are embodied in the survey, the field figures for which are at present under examination.

154. A study has also been made of the seasonal variation in prices of the Colony's chief agricultural commodities and the periods at which shipments are made of our export products. This included a study of the competition, from the point of view of arrival on the importing market, between British Guiana and Burma rice in the West Indies. The seasonal variation in the employment of labour on sugar estates in each district of the Colony was also studied and a similar examination made of the activities of banks supplying credit to small cultivators. Indexes of seasonal variation have been computed in all cases. The results obtained from the labour study should be of service to the estates' management since seasonal fluctuation in supply of and demand for labour continues to be a source of much concern. The information on the periods when agricultural credit is most needed is of special value to the Department of Agriculture which has executive and administrative control over the Co-operative Credit Bank management throughout the Colony.

CHEMICAL INVESTIGATIONS.

155. The Division has been occupied with general agricultural chemical work both on the coastlands and in the interior of the Colony. The total number of samples examined in the laboratory during the year has increased considerably, due to the fact that the Division received assistance from a supernumerary staff employed as a result of the receipt of grants from the Colonial Development Fund, Imperial Chemical Industries, Ltd., and Messrs. Booker Bros. McConnell & Co., Ltd.

156. As previously mentioned early in the year two representatives of the United Fruit Company paid an extended visit to the Colony in order to assess the possibilities of inaugurating an export trade in bananas. In the selection of land suitable for the commercial cultivation of the Gros Michel variety the texture, acidity and salinity of the soil play an important part. At that time the Division had examined as regards acidity, texture and salinity over eight thousand samples of soil collected in widely distributed parts of the Colony. This information was placed at the disposal of the visitors and was of material assistance in selecting

areas for personal observation. As a result their visits were principally confined to the banks of the main rivers of the Colony. The Chemist-Ecologist accompanied these representatives to Surinam where soil samples were collected from areas formerly under Gros Michel bananas. These soils were found to be similar to those occurring on the coastal belt of this Colony.

157. A number of advisory visits were paid to the Colony's sugar estates which were for the most part concerned with instances of crop failure.

158. A certain amount of laboratory work has been executed in connection with the problem of flood-fallowing. Perhaps the most striking point that has emerged from this study is the fact that flood-fallowing causes a very considerable increase in the amount of 'available' iron present in the soil. There is a low, but very definite correlation between the amount of 'available' iron present in the topsoil at planting and the final tonnage of cane. In many cases the content of organic matter is reduced as a result of flooding.

159. The third *Sugar Bulletin* published during the year gives a description of the progress made in determining the fertiliser requirements of the sugar-cane soils of this Colony.

160. During the year the refractometer has been applied to the selection of sugar-cane seedlings in their first year. It is now possible to exercise a rigid selection, both as regards weight and quality, in the early stages of propagation and this advance should accelerate the work considerably.

161. The pineapple canning industry has received assistance from the Chemical Division during the year both in the field and in the factory. A pot experiment concerned with the manual requirements of the crop is in progress and is yielding results of considerable value.

162. During the year samples of local Tonka Beans have been compared with samples of the Trinidad bean. It appears that the local bean is smaller, shorter and wider than the Trinidad bean. It contains approximately half as much coumarin.

163. In the early part of the year a short visit of inspection was paid to the areas opened up by the Bartica-Potaro-Tiboku Road. These areas are agriculturally unpromising. During the latter part of the year the Chemist-Ecologist toured the Rupununi District and the Pakaraima Mountains as a member of the advance party investigating the possibilities of Assyrian settlement in those areas.

ENTOMOLOGICAL INVESTIGATIONS.

164. The following crop pests have received attention by the Supernumerary Entomologist for the period under review.

(1) *Sugar-cane.*—The Dynastids, *Dyscinetus geminatus* and *D. bidentatus* which do considerable damage to cane tops and young plants were not recorded from any of the estates during the year.
There was likewise a period of respite from the Yellow Sugar-cane Aphis, *Sipha flava* Forbes. This insect turns up as a rule during the wet seasons and in cases where severe attacks occur on young plants the growth may be seriously retarded. The absence of this pest was probably due to the low rainfall—the total figure for the year was only 81.04 inches with 28 inches in January during which flood conditions prevailed which were not calculated to foster the aphis. The wet months June and December had only 9.21 and 5.63 inches respectively both of which figures are well below the average.

(2) *Rice.*—The rice weevil investigations were prosecuted further, the use of harmless adulterants as deterrents being the main line of research. The results obtained shew that the development of the weevils may be greatly

retarded for at least six months by the use of Calcium carbonate at the rate of 1 lb. to the bag of 180 lb. of rice. Sodium fluor-silicate used at the rate of 0.07 per cent. by weight gave similar results. The experiments was fully described in a paper published in the *Agricultural Journal of British Guiana*, Vol. VI., No. 1.

The Padi bug, *Mormidea poecila* Dall. turned up towards the end of September at Plantation Albion on the Courantyne Coast. The attack though short-lived was severe and caused no insignificant loss of crop. The life-history of the pest was studied and published in the *Agricultural Journal*, Vol. V., No. 4.

Neither of the padi stem borers, *Diatraea* or *Scirpophaga* did any noteworthy damage.

(3) *Pineapples.*—A wilt disease of pineapples was investigated. Mealy-bugs though present on some of the plants did not appear to be implicated.

The butterfly, *Tmolus echion* Butl. for some unknown reason continued to be very scarce all the time.

The Bug, *Athaumastus laetus* Mayr. turned up at the pineapple cultivation at Dalgin together with its chalcid egg-parasite.

(4) *Coconuts.*—There were no outbreaks of *Brassolis sophorae* L. worth mentioning.

(5) *Miscellaneous pests.*—The Chrysomellid, *Colaspis hypochlora* Lefev. was recorded seriously injuring plantains at Beterverwagting, Agricola and parts of the West Coast, Demerara.

A Scolytid beetle was found attacking Mahogany trees—both British Honduras and West Indian—in the North West District.

BOTANICAL AND MYCOLOGICAL INVESTIGATIONS.

165. The Botanist and Mycologist was absent on leave for four months and during this period attended the Imperial Mycological Conference held in London, as the Colony's representative.

166. No serious disease of major crops occurred during the period under review.

167. Serious damage was caused to the coffee cultivation in the Pomeroon District by the floods at the beginning of the year. Moko disease of plantains and bananas was identified definitely as one of the causes of the wilting of these plants. A search is being made for cacao trees which might prove immune or resistant to Witchbroom. The 'browning' disease of pineapples at the Pineapple Company's concessions was less evident than in the previous year.

168. A large quantity of unnamed material from the Jenman Herbarium which had been sent to Kew for determination was returned with the required information.

169. Dr. W. A. Archer, Ph.D., of the United States Department of Agriculture spent some four months in the Colony studying Fish Poisons. He brought with him plants of a number of new citrus varieties from the United States, and also gave to the Department duplicates of his collections made while in the Colony, for which we are indebted to him.

INVESTIGATIONS IN INTERIOR OF THE COLONY.

170. The question of the suitability of the interior of the Colony for extended settlement of immigrants has received consideration during the year. Unfavourable reports had previously been made by Agricultural Officers on the question of permanent settlement on the Bartica-Potaro Road. Those areas which have been surveyed by Agricultural Officers are detailed below.

171. *Potaro-Tiboku Area.*—In order to investigate the possibilities of agricultural settlement in this area a tour was made by the Chemist-Ecologist, in whose divisional report the subject is dealt with in more detail, with the object primarily of undertaking a reconnaissance survey of the soil types of the area, assessing their agricultural possibilities and roughly ascertaining their distribution. The main soil type of the area is wallaba sand possessing negligible agricultural possibilities although certain patches of red clay or loam are to be found in the district. Although this red soil might with special care possibly support slow-growing orchard crops such as oranges, coffee and grapefruit they are generally not suited to the permanent cultivation of ground provisions. They are of relatively low fertility, contain considerable quantities of ironstone gravel and prone to erosion when cleared. It appears, therefore, that a permanent settlement depending entirely upon agricultural pursuits is not likely to be successful in this district.

172. *Rupununi District and Assyrian Settlement.*—The question was raised of the settlement in the Rupununi District of 10,000 to 15,000 Assyrians by the League of Nations, who sent out a commission to report on the suitability of the District. The Commission consisting of Brigadier General J. C. Browne and Signor Giglioli arrived in the Colony on October 30, 1934. An advance party consisting of the Chemist-Ecologist, Agricultural Superintendent, Essequibo, Government Veterinary Surgeon, Assistant Government Medical Officer of Health and a Government Surveyor left for the Rupununi in October. The objects of the tour were to obtain, in advance, information regarding the agricultural possibilities of the area for submission to the Commission on the spot and to accompany the Commission at a later stage, in order to give opinions on the areas inspected. The reports of the Agricultural Officers and the Government Veterinary Surgeon have been forwarded to the Secretary of State. The Commission have since decided that the district is unsuitable for the purpose in view.

AGRICULTURAL EDUCATION AND EXTENSION.

District Work.

173. Divisional Agricultural Officers are stationed in Berbice, East and West Demerara, Essequibo and the North West Districts, and the work undertaken in these several districts is usually given in detail in their reports which are published separately. Briefly, such work which was considerably increased by flood relief activities during the period, includes:

(1) Field experimental work with the major crops (*i.e.* sugar and rice) in collaboration with the specialist officers concerned where such is carried on in their districts.
(2) The organisation of supplies and distribution of seed through accredited padi farmers, and visits to such farms for instructional work at intervals.
(3) District agricultural inspection and educational work on all matters pertaining to agriculture, including control of crop pests and diseases.
(4) Experiments and demonstrations with various minor crops, distribution of planting material, etc.
(5) Supervision of agricultural stations, sub-stations, livestock centres, school gardens, field competitions, etc.
(6) Encouragement of the extension of areas suitable to fruit, notably citrus, as well as food and money crops supplementary to rice and ground provision, *e.g.*, green vegetables, peas and beans, papaws, etc., for all of which there is a ready local market.
(7) Collection and collation of agricultural census returns.
(8) Co-operative Credit Bank work.
(9) General extension and advisory work, including rice grading where such is required.

174. *District Agricultural Committees.*—The two District Agricultural Committees appointed towards the close of 1933 in the East and West Demerara Districts

functioned during the year. The Director of Agriculture is Chairman of both Committees with the District Commissioners as Vice-Chairmen. Representatives from the sugar estates, rice and cane-farming industries serve as members whilst the Elective Members of the various districts are also on these committees. The scope and activities of the Committees were outlined in paragraph 135 of the Administration Report for 1930 in which year detailed recommendations were made to Government. The proceedings of the meetings have been published from time to time in the *Agricultural Journal of British Guiana*. It is sufficient to report here that the most important item under discussion has been the question of the establishment of an export trade in bananas referred to elsewhere in this report.

175. *School Gardens.*—There are six registered school gardens in the Colony, namely:—Berbice—Auchylne School, Edinburgh School; Demerara—Friendship Wesleyan School, Stewartville Congregational School; Essequibo—St. John's E. School, Sans Souci Wesleyan School. The work forms part of the schools curriculum by arrangement with the Education Department. The Department supervises the agricultural activities in the gardens, whilst the Education Department is responsible for the discipline of the teachers and pupils. Good work has been done by pupils in most cases, although it is felt that the time allotted for such work is all too short. Regular visits have been paid by the District Officers and instruction given.

176. *Field Competitions.*—The following is a list of the agricultural competitions which were held in the various districts during the year.

(1) *Rice.*—For the best block of transplanted pure line padi on an area not less than half an acre in extent in Berbice, Demerara and Essequibo:
- (*a*) On the Corentyne Coast in the Crabwood Creek District and between Villages 47 and 49.
- (*b*) On the East Coast, Demerara, between Kitty to Mahaica and between Mahaica to Abary.
- (*c*) In West Demerara between Vreed-en-Hoop to Hague.
- (*d*) In Essequibo District—On the Coast; on Wakenaam Island and on Leguan Island.

(2) *Miscellaneous Crops.*—For the best miscellaneous farm the area to be not less than half an acre in extent in Berbice, Essequibo and North West:
- (*a*) On the East Bank, Berbice, between Islington and Sisters.
- (*b*) In the Pomeroon District.
- (*c*) Hill lands—North West District.

(3) *Onions.*—For the best block of onions grown from seed obtained from the Department of Agriculture the area to be not less than 5 square rods in Berbice, Demerara and Essequibo:
- (*a*) In the Berbice District—On the Corentyne Coast between Nigg and Friendship and on Plantation Blairmont.
- (*b*) In the East Demerara District—On the East Coast between Victoria to Unity and in Buxton Village.
- (*c*) In the Essequibo District—On the Essequibo Coast and on Wakenaam Island.

The special competitions in areas affected by the floods are given in para. 21.

177. *Jubilee Agricultural Exhibition.*—Towards the end of the year plans began to crystallise and preparations started for the holding of a Jubilee Agricultural Exhibition in 1935.

LIVESTOCK.

178. The floods took a heavy toll of all classes of stock in the coastal areas. The old system of management, with its attendant risks from overstocking the limited pastures and semi-starvation in periods of drought and floods, no doubt accentuated, and was a contributory factor to, the losses sustained. The *intensive*

system of management practised on the Stock Farm has been advocated for some years but is viewed with disfavour by cattle owners, doubtless due to the low prices paid for milk. As it is useless to attempt improvements of pasture without an assured drainage, the only practical improvement of conditions for coast cattle lies in the direction of limiting the number stocked in intensively cultivated areas.

179. The prolonged drought which followed the floods caused farmers to cease cultivation and good agricultural lands were turned into grazing areas. As a result of this, coastal cattle were in a better condition in 1934 than at any other period within the last six years. Their emaciated condition in normal years is mainly due to starvation caused by insufficiency of pasturage. Unless steps are taken during 1935, when these agricultural lands will again be cultivated, to procure grazing farther afield, it is feared that the cattle will revert to their usual deplorable condition.

180. The following is a brief resumé of activities of livestock improvement efforts during the period 1928-1934.

(1) *Cattle.*—Number of services recorded for the period—1,352. There were no services recorded in 1928, the only mature bull being at Onderneeming.

1929	...	...	49	services
1930	...	...	121	„
1931	...	...	197	„
1932	...	...	245	„
1933	...	...	320	„
1934	...	...	420	„
			1,352	services.

(2) *Swine.*—In addition to 5 boars at service, 181 breeding pigs were distributed.

(3) *Poultry.*—Average number of pens of poultry maintained 5, while 375 head of young stock and 17,000 eggs were sold.

(4) *Stock Register.*—The following breeding animals were sold: 4 bulls, 5 cows, 7 heifers, 2 boars, 1 sow, 1 ram and 2 ewes. The livestock in hand at the end of 1934 consisted of: 6 Holstein-Friesian bulls at stud; 4 young Holstein-Friesian bulls which will be ready for service in 1935; 2 Guernsey bulls at stud; 1 Guernsey bull calf; 3 Holstein-Friesian cows; 1 Holstein-Friesian heifer calf; 1 Jack Donkey at stud; 2 working donkeys; 1 boar, 5 sows and 19 young stock—Canadian Berkshire breed; 6 pens of poultry (utility breeds) and 2 pens of Ducks.

(5) *Fodder Trials.*—Analyses and trials with various local fodder plants and grasses have been made while valuable grasses and plants have been introduced and established.

(6) *General*—In 1928 there were no suitable stables for the few animals on hand. During the period 1928-1934 the following improvements were made. The land allocated for livestock was fenced and divided into paddocks. Stables were built for bulls, cows and donkeys. A piggery with portable house and runs and other necessary equipment for open air pig-breeding was established. A small poultry farm with portable houses and runs, incubator house and incubators, brooder house and brooders, and growing houses and chicken runs were established. A food barn with the necessary equipment for storing and grinding mash, oil engine and mill, bins, weighing machine, etc., was built.

181. Progress has thus been made with dairy cattle, pigs and poultry but in regard to beef cattle the same cannot be recorded. This industry is in the hands of a more substantial class and it seems a pity that they have not been able to go in

for the systematic improvement of their animals by co-operating in the importation and use of improved sires. A successful start has been made with a livestock centre at Leguan where the Agricultural Officer has done a great deal of educational work among the people, who are making good use of the Guernsey bull, which has been stationed there, and a pen of poultry. The same cannot be said of the efforts made in connection with the co-operative marketing of milk produced in the Island.

182. *Grants-in-aid.*—On October 19, 1934, this Government received the following grant from the Colonial Development Fund for the improvement of the livestock industry of the Colony:

A loan of £1,500, free from interest, repayable in five years to establish a revolving fund for the purchase of breeding stock in the United Kingdom.

This fund will be utilised for the purchase and distribution of bulls chiefly of beef type, immunised to local disease, to approved ranchers and cattle owners in British Guiana on easy terms of repayment. The amounts realised from the sale of animals will be paid back into the Fund which will then be available for the purchase of further and additional stock for distribution. The introduction of pure bred animals into the herds of the Colony will be assured thereby while improvement of the cattle and creation of a reliable beef supply for the neighbouring British Colonies will be placed on a more satisfactory basis. It is hoped that ranchers and cattle owners generally will make full use of the facilities provided by this Grant.

Animal Health.

183. *Anthrax.*—There was an outbreak of anthrax amongst mules in Essequibo, and the animals were inoculated. Only one death occurred.

184. *Mal de Caderas.*—In the Rupununi District this disease has been prevalent for over three years and has caused heavy losses amongst equines. Advice as regards control and treatment was given to ranchers concerned but no action was taken by them.

185. *Tuberculosis.*—A high percentage of exported animals, all from the Berbice District, were found to be affected with this disease.

186. The chief drawback to the control of animal disease is the lack of livestock regulations. The stock-owners usually accept the advice of Government Veterinary Surgeon when it suits their convenience, more often such advice is ignored. A Bill to make provision for the improvement of the breed of cattle and other animals and with respect to the prevention of contagious and infectious diseases among them has been drafted and will, it is hoped, be introduced into Legislative Council during 1935.

Livestock Returns.

187. The returns of livestock in the Colony for 1934 are shown in Table XIV.

TABLE XIV.

LIVESTOCK RETURNS, 1934.

County.	Horned Cattle.	Horses.	Mules.	Asses.	Buffaloe.	Sheep.	Goats.	Swine.
Berbice	37,402	458	436	3,056	...	7,800	3,400	5,600
Demerara	46,073	576	1,128	2,507	82	8,905	4,500	6,698
Essequibo	5,527	24	34	560	2	896	1,068	1,251
Hinterland Savannahs ...	60,660	1,830	14	4	...	208	72	551
Total	149,662	2,888	1,612	6,127	82	17,809	8,980	14,110

BOTANIC GARDENS AND NURSERIES.

189. The Superintendent was absent on leave from June 13 to November 14.

188. Very heavy rain fell at the beginning of the year, the Gardens being flooded, in common with the rest of Georgetown, on the night of January 7-8. The rain-

fall for the remainder of the year, however, was below normal. Planting out of trees and shrubs was continued in the Front Gardens, Park Lands and Avenue. A number of new plants were obtained by exchange from Trinidad and other sources, including also some palm plants from Florida and a large quantity of seed from Sydney, Australia.

190. An illustrated Guide to the Gardens was published at the end of the year. A further section of pipe line, passing through the nurseries, was connected to the water supply. The storeroom was rebuilt during the year, and at the end of the year a motor mower was obtained. The production of budded citrus was continued, and certain individuals wishing to cultivate citrus on a fairly large scale were assisted to start their own nurseries.

SEED AND PLANT DISTRIBUTION.

191. The following is a list of the planting material distributed locally by the Department during the year 1934. This is entirely separate from distributions through Flood Relief Funds shown elsewhere in this report, (*vide* para. 26).

Field and Garden Crops.

Sugar cane	39,978	cuttings.
Padi (Seed)	209,860	lb.
Padi (Seedlings)	260,000	
Plantains	33	suckers.
Bananas	2,031	,,
Papaw (Seed)	3¼	lb.
Papaw (Plants)	136	
Grape Vine	89	plants.
Tobacco (Seed)	3	lb.
Tobacco (Plants)	398	
Legumes (Cover Crops)	109	lb.
Peas and Beans (Edible)	119	lb.
Fodders (Various)	1,920	cuttings.
Onion (Seed)	60	lb.
Onion (Seedlings)	6,400	
Eschallot	1¼	lb.
Tomato (Seed)	3	lb.
,, (Plants)	9,203	
,, (Cuttings)	55	
,, (Fruit)	92	lb.
Cabbage (Plants)	684	
Jerusalem Artichoke	4	lb.
Boulangers (Plants)	117	
,, (Seed)	7	oz.
Pumpkin (Seed)	8	oz.
Squash (Seed)	8	oz.
Ginger	3¼	lb.
Sweet Corn	¼	lb.
Vegetable Seeds (Assorted)	20	lb.
Pepper (Chilli)	300	plants.
Seed Coconuts	18	
Sweet Potatoes (cuttings)	108,995	
Sweet Potatoes (tubers)	10,750	
Pineapple	389	suckers.
Krowa	25	suckers.

Orchard Crops.

Citrus (budded)—Oranges...	...	1,124 plants.
Citrus (budded)—Grapefruit	...	778 „
Limes (budded) ...	...	526 „
Limes (seedlings) ...	...	236
Coffee (Liberian) ...	...	500 seedlings.
Cocao ...	...	1,951 „
Mangoes (Grafted) ...	...	41 plants.
Pears (Grafted) ...	...	13 „
Other Economics ...	...	1,469 „

SEED AND PLANT EXCHANGE.

192. A large quantity of new seeds and plants were received during the year. A number of ornamental plants were exchanged with Trinidad, to whom we were also again much indebted for supplies of citrus budwood. Plants of six new Tangelos and other citrus varieties were received from the United States Department of Agriculture through Dr. Archer. Half a dozen varieties of grafted mangoes were sent us from Dominica, and for a selection of yams we were indebted to the Imperial College of Tropical Agriculture, Trinidad. A large number of palm plants were sent us from the Coconut Grove Arboretum, Florida, with whom we have exchanged seed, and a further selection of seed was received from the Botanic Gardens, Sydney, including many species of Acacia and Eucalyptus. A number of plants collected by Dr. Archer during his stay in the Colony were also planted in the nursery. In response to requests received from other Botanic Gardens and allied institutions who had received our exchange catalogue, a number of parcels of seed were sent out during the year, and in addition a large selection was forwarded to His Excellency the Governor after his departure from the Colony.

193. The introductions by the Department during 1934 of economic and ornamental plants and propagating material have been published quarterly in the *Agricultural Journal of British Guiana* which re-appeared during the year under review.

PUBLICATIONS AND LIBRARY.

194. The Agricultural Journal of British Guiana, the official publication of this Department, re-appeared in March, 1934, after its publication had been suspended for two years—1932 and 1933—for economic reasons. The absence of the journal has been felt acutely and one of the factors responsible for its re-appearance was the requests received by the Department from those engaged in agriculture both in and out of the Colony. The Library is in receipt of a wide range of periodical literature from all parts of the world, including research bulletins, administration and miscellaneous reports, etc. The Department can only afford to receive such publications on the basis of exchange.

195. Agricultural Notes compiled by the Department, simply worded, on subjects of a topical nature, have again been published in the local press, for whose cooperation the Department is duly grateful. In addition to the Journal, Sugar Bulletin No. 3 and an illustrated Guide to the Botanic Gardens were published. The Government Botanist and Mycologist published a note on the Foreshore Vegetation in the Journal of Ecology and a similar account in "*Timehri*," a local journal.

196. The classification and indexing of the Department's library have been completely re-organised. With the grouping of periodical publications under their several subjects and the system of cross-indexing, information is rendered more readily available than before. Unfortunately, after the necessary attention has been given to binding periodicals, lack of funds practically prohibits the purchase of text books.

AGRICULTURAL LEGISLATION.

197. The following is the chief agricultural legislation enacted during 1934 :—

1. *Rice (Export Blending & Grading) Regulations, 1934.*—The chief features are :

(*a*) Rice other than broken and Super Broken may not be graded unless blended ;

(*b*) Persons shall not blend rice unless licensed by the Director of Agriculture ;

(*c*) A blender's fee shall not exceed 2 cents per bag of 100 pounds and 4 cents per bag of not more than 100 pounds ;

(*d*) All applications for grading must be accompanied by a certificate from a registered blender ;

(*e*) Applications for grading must be submitted to the Rice Marketing Board and then to the Inspector ;

(*f*) The Inspector may refuse to grade if blending has not been satisfactorily performed.

2. *Rice (Export Blending & Grading) Regulations, No. 2, 1934.*—The chief purpose was to declare that the Rice (Export Blending & Grading) Regulations, 1934, should come into force on October 1, 1934.

3. *Rice (Export Blending & Grading) Regulations, No. 3, 1934.*—The chief feature was to make provision for No. 1 Extra grade.

4. *Rice Factories Rules, 1934.*—The chief feature was to specify the type of books to be used in factories.

5. *Proclamation dated 13th January, 1934.*—Prohibiting the export of rice as a result of conditions caused by the floods ;

6. *Proclamation dated 22nd January, 1934.* Fixing the quantity of rice which might be exported at 25 per cent. of quantity called for by contracts. On February 1 this proclamation was revoked.

7. *Order-in-Council under Section 8 of the Wild Birds' Protection Ordinance*—amending the schedule altering the close season. The chief features are that the names of certain birds are included in or excluded from the schedules and that the period to be observed as the close season in respect to Wild Birds shall be from April 1 to August 1 with the exception of the Ibises, for which the close season shall be from June 1 to August 1.

8. Order-in-Council allowing the importation into the Colony of certain fruits and vegetables from Netherlands Guiana.

9. *Board of Agriculture Ordinance, 1934. (Ordinance No. 26 of 1934).* To provide for the establishment of an Advisory Board of Agriculture.

GENERAL REMARKS.

198. There is hardly need to add very much under this head as the condition of the various industries and the work carried out by the Department has been clearly stated in the foregoing pages.

199. The outstanding event of the year has been the 'Floods' which administered a severe check to all agricultural enterprise and more particularly to the rice industry. The resources of the Department were heavily taxed in dealing with a situation unprecedented in the history of the Colony.

200. The important task allotted the Department was, in the first place, that of ensuring a sufficiency of local food-stuffs in view of serious damage to rice and

in many cases complete destruction of ground provision cultivations. Secondly, to provide such aid to the staple industries of the Colony as would assist them to recover in the minimum of time. The first has been accomplished though not without much extra work and great anxiety. The second is in process of being achieved, and at the time of writing, indications are that, at the end of 1935, the sugar crop for the year will have even exceeded the average production figure reached in recent years; while the rice industry, with favourable planting weather at mid-year, should recover much of its production status, though not all. In this connection, the Department's pure line seed campaign continues unabated and is gathering more and more momentum as time goes on. Good progress is also to be recorded in the breeding work and search for new varieties. A substantial contribution has also been made to the study and control of the rice weevil; millers and exporters should derive some profit from the results of these investigations, if they are followed up in a practical way. The marketing of the rice crop, nevertheless, continues to cause anxiety as a result of Indian competition and the practices adopted by unscrupulous exporters of giving rebates, which have proved difficult of control by the Marketing Board.

201. Unfortunately, prices for all kinds of produce are still very low. There is nothing to indicate, however, that sugar and rice are likely to give place to any other crop in the Colony's general economy, and these must be its main bulwark and support, both now and in the future. The Department has from the beginning emphasised this view, which becomes increasingly clear as more experience is gained.

202. Mention must be made of the steady expansion of the cane-farming industry, particulars of which will be found in para. 48. In this connection, the Department's efforts have been greatly assisted by the enthusiasm of the District Commissioner, East Coast, Demerara, and the readiness of the sugar estate proprietors to meet the demands made on them, notably as regards prices, in a generous and truly co-operative spirit.

203. In addition to the usual research activities in connection with soils, fertilisers, varieties, flood-fallowing, etc., which continue to be a special feature of the Department's sugar work, the introduction and vigorous efforts made to secure rapid spread of the Amazon fly parasite of moth-borer will, it is hoped, also help to bring about increased field returns.

204. The useful start made in connection with agricultural economic investigations referred to in paras. 146—151 might be pointed to as a field which offers unlimited scope in the collection and classification of information, valuable not only in matters affecting agricultural development, trade and commerce, but also in the study and adjustment of such questions as labour relationships, unemployment, cost of living, etc.

205. Reference might also be made to the gradual progress which is being made in connection with the improvement of livestock in the Colony, notably dairy cattle, pigs and poultry; to the increased interest in minor industries such as apiculture, citrus and other fruit, together with the cultivation of quick cash crops such as garden vegetables, onions, tomatoes, peas, beans, etc. The success in this latter branch of agriculture has been largely due to the efforts of the District Officers in carrying out experiments and demonstrations and the encouragement given to farmers in the use of improved seed, now freely obtained through the Department's Sub-Stations, field competitions, etc.

206. School and home garden work is attracting a great deal of interest in the rural communities and good progress is being made where head-teachers are keen on practical work and will devote sufficient time to it.

207. Administration duties remain heavy, and it is difficult to cope with the increasing volume of work, the nature of which invaribly requires careful study and prompt attention. This applies not only to matters affecting departmental policy, preparation of memoranda and reports on various schemes for development, drainage and irrigation questions, but also in regard to general correspondence, committee meetings, interviews, Executive and Legislative Council work. During the year, several officers were on leave, and this helped further to accentuate the position, as there is no extra staff to fill any gaps due to sickness, leave or other enforced absences.

208. It is pleasing to record that the construction of the Department's new buildings was completed and the Administration staff, Entomological, Botanical, Co-operative Credit Banks, and Meteorological Divisions were transferred to the new quarters towards the end of August.

209. In conclusion, I should like to express my great appreciation of the loyal help rendered by the staff during a very trying period. The thanks of the Department are due also to the agricultural and mercantile community for assistance generously rendered, and to the local newspapers for their courtesy in distributing agricultural information.

J. SYDNEY DASH,
Director of Agriculture.

May 31, 1935.